THE RESOURCES AGENCY OF CALIFORNIA

Department of Water Resources

BULLETIN No. 66-59

QUALITY OF GROUND WATERS IN CALIFORNIA

1959

PART II
SOUTHERN CALIFORNIA

FEBRUARY 1963

EDMUND G. BROWN
Governor
State of California

WILLIAM E. WARNE
Administrator
The Resources Agency of California
and Director
Department of Water Resources

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EDMUND G. BROWN
GOVERNOR OF
CALIFORNIA

WILLIAM E. WARNE
ADMINISTRATOR
RESOURCES AGENCY

ADDRESS REPLY TO
P. O. Box 388
Sacramento 2, Calif.

THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
1120 N STREET, SACRAMENTO

December 28, 1962

Honorable Edmund G. Brown, Governor,
and Members of the Legislature of the
State of California

Water Pollution Control Boards

Gentlemen:

I have the honor to transmit Bulletin No. 66-59 entitled "Quality of Ground Waters in California, 1959, Part II, Southern California." This report covers the period January through December 1959. The quality of ground waters in Northern and Central California is discussed in Part I, published in July 1961.

This is the fifth in a continuing series of reports on the ground water quality monitoring program conducted by the Department of Water Resources. Under this program, water samples from representative wells in ground water basins throughout the State are collected and analyzed, and an annual evaluation of ground water quality conditions is made. Mineral and radiological analyses were made of ground waters taken from approximately 200 wells in 16 monitored areas in Southern California.

Less than normal precipitation in the 1958-1959 rainfall season, and the consequent greater utilization of ground water intensified existing problems of impairment of ground water quality in the areas monitored in Southern California during 1959. Sea-water intrusion and connate water encroachment or pollution resulting from return of waste waters to the underground basins continued to exhibit local effects of degradation on ground water quality.

Very sincerely,

William E. Warne

Director

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

EDMUND G. BROWN, Governor
WILLIAM E. WARNE, Administrator, The Resources Agency of California
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ACKNOWLEDGMENT

The broad coverage of the statewide ground water quality monitoring program is made possible through the combined efforts of many public and private agencies. Although the program was initiated by the Department of Water Resources, the present scope of the program could not have been achieved without the valuable assistance of these other agencies. The generous and valuable assistance of the following agencies is gratefully acknowledged:

United States Geological Survey
California Department of Public Health, Bureau of Sanitary Engineering
California Disaster Office, Radiological Service
Los Angeles County Flood Control District
Orange County Air and Water Pollution Control Committee
San Bernardino County Flood Control District

THE GROUND WATER QUALITY MONITORING PROGRAM

Water development to meet the needs of California's phenomenal growth during the past decade has become one of the major problems facing the State. As the water resources of California are more fully utilized to meet the requirements imposed by the rapid expansion in population, agriculture, and industry, and as the number of suitable surface storage sites dwindles, water development planners are turning more and more to ground water supplies. Although the use of ground water has been, and is, one of the major factors contributing to the economy of the State, insufficient data are available regarding the mineral quality of such ground water supplies. The present widespread dependence upon ground water, together with the need for more intensive utilization of underground storage, requires constant vigilance coupled with remedial action, where necessary, to assure that the quality of ground water remains suitable for all intended uses.

In view of the extensive occurrence of ground water and its relatively slow rate of movement, determination of ground water quality and detection of changes therein require reliable long-term observation and records. Such data are essential to any program of quality control and are indispensable to formulation of plans for the coordinated operation of surface and underground storage. To help meet this need, a statewide program of observation and study of ground water quality was initiated by the Department of Water Resources in 1953 under the authority of Section 229 of the California Water Code.

Section 229 of the California Water Code directs that the department shall:

> "... investigate conditions of the quality of all waters within the State, including saline waters, coastal and inland, as related to all sources of pollution of whatever nature and shall report thereon to the Legislature and to the appropriate regional water pollution control board annually, and may recommend any steps which might be taken to improve or protect the quality of such waters."

Accordingly, the objectives of the ground water quality monitoring program are:

(1) To provide information on the prevailing mineral quality of ground waters;

(2) To provide a reliable, continuing check on quality of ground waters;

(3) To secure data relating to significant changes in mineral quality, to evaluate the causes for these changes and to identify and delineate the areas affected by such changes;

(4) To notify the appropriate regulatory agencies regarding the findings of the program, and

(5) To provide the required data on ground water quality for the purpose of planning and constructing water resources developments.

Part I of this bulletin, dated July 1961, presents data on, and an evaluation of, ground water quality conditions in Northern and Central California for the period January through December 1959. The area covered in Part I comprises all of Water Pollution Control Regions 1, 2, and 5; Region 3 north of the San Antonio-Salinas River drainage boundary; and Region 6 north of the northern Mono Lake drainage boundary. Part II presents data on, and an evaluation of, ground water quality conditions in Region 3, south of the San Antonio-Salinas River drainage

boundary; Region 6, south of the northern Mono Lake drainage boundary; and all of Regions 4, 7, 8, and 9. The areas of Southern California monitored during the 1959 program are shown on Plate 1, "Monitored Areas 1959."

Data for previous periods are included in the following reports:

1. California Department of Public Works, Division of Water Resources, Water Quality Investigations, Report No. 14, "Ground Water Quality Monitoring Program in California, Progress Report 1953-1954."
2. California Department of Water Resources, Division of Resources Planning, Bulletin No. 66, "Quality of Ground Waters in California, 1955-1956."
3. ----, "Quality of Ground Waters in California, 1957."
4. ----, Bulletin No. 66-58, "Quality of Ground Waters in California, 1958."

In establishing the areas included within the ground water quality monitoring program, requests and suggestions from regional water pollution control boards and other interested water agencies have been considered. During 1959, the program in Southern California led to the collection and analysis of ground water samples taken from about 200 wells in 16 ground water basins or portions of basins. The geographical location and areal extent of each of the monitored areas is indicated on Plate 1.

The selection of the individual wells sampled is governed, to a large extent, by the availability of well logs. Sufficient information such as depth, aquifers encountered, and depths of perforations is desirable for each sampled well to assure that data obtained are useful.

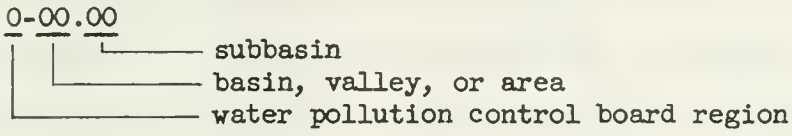
Wells are added to, or deleted from, the network according to changing ground water conditions in an area. For example, a well showing prominent effects of sea-water intrusion is generally removed from productive use and, in many instances, sampling becomes impracticable. Accordingly, another well is substituted, if available.

Tests made of ground water quality include mineral and radiological determinations. The frequency of sampling, type of analysis, and density of the sampling network for mineral tests depend largely on the conditions in the area being monitored. In areas where water quality problems are known to exist and where extensive use is made of ground water supplies, samples are taken one or more times each year. In areas where limited use is made of ground waters, samples are taken periodically until sufficient data are collected to determine the water quality of the basin and thereafter as frequently as the land development and water use warrants.

Radioassays of well waters are made annually. In general, only the minimum number of wells necessary to show the areal extent of problems, if any, or to evaluate ground water conditions, are included in the radiological monitoring network.

In this report the monitored areas are grouped for purposes of discussion by water pollution control board regions, the boundaries of which, in most cases, coincide with those of the major drainage basins of the State. Within these regions the monitored areas are identified by basin numbers which provide quick data reference and permit machine processing of the data. The identifying basin numbers used in this report are based on a decimal system in the form 0-00.00. The

number to the left of the dash refers to the regional water pollution control board the basin is located within. On the right of the dash the first digit or digits refer to the basin, valley, or area. Digits to the right of the decimal, if any, refer to the subbasin number as shown below.



It should be noted that a "monitored area" is defined as that portion of a ground water basin which lies generally within the limits of an established network of monitored wells. It does not necessarily include the entire ground water basin.

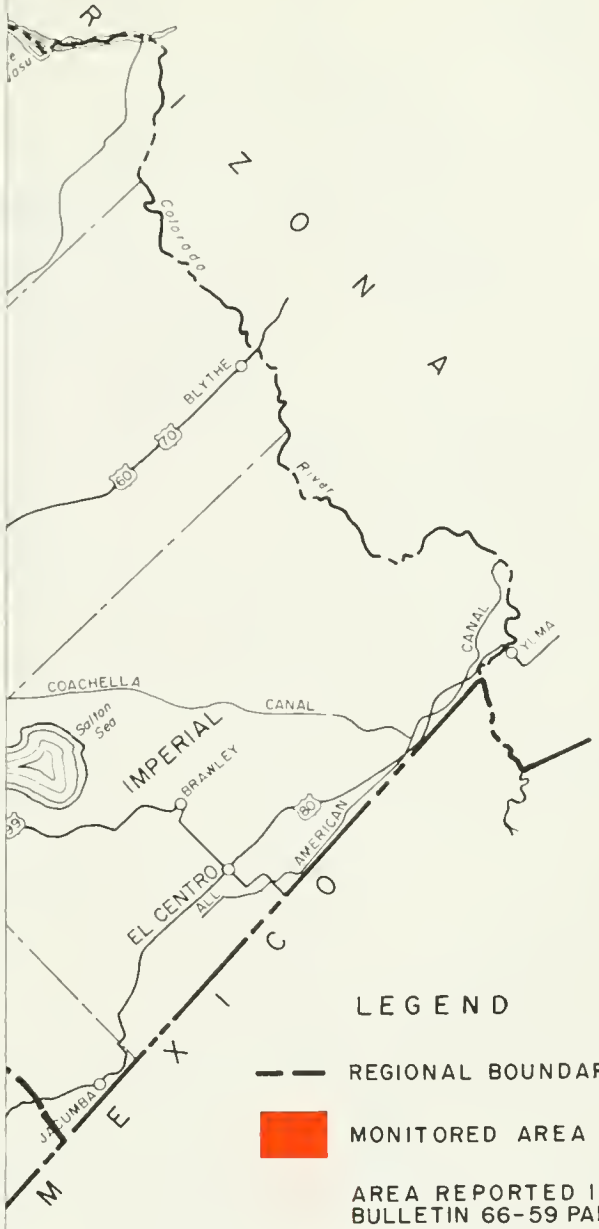
Wells selected for inclusion in the ground water quality monitoring network are assigned numbers by township, range, and section, based upon their location. The numbering system is the same as that utilized by the United States Geological Survey. Under this system each section is divided into 40-acre plots, which are lettered as follows:

D	C	B	A
E	F	G	H
M	L	K	J
N	P	Q	R

Wells are numbered within each of these 40-acre plots according to the order in which they are located. For example, a well having a number 3N/6E-24A2 is located in Township 3 North, Range 6 East, and in Section 24. It is further described as the second well identified in the 40-acre plot lettered A.

The information presented in the text that follows for each monitored area includes: a brief description of the area and the monitoring program; the occurrence, development, and beneficial uses of ground water; a discussion of major waste discharges; and an evaluation of any significant changes in ground water quality. Following the presentation for each area, a graph shows conductivity and problem constituent ranges and, where meaningful, graphs of fluctuations of problem constituents in selected wells. A map of the monitored area shows monitored well locations and known area of ground water degradation.

Following the discussions of the monitored areas are two appendixes that present detailed information on procedures and analyses. Appendix A presents discussions of types of mineral analyses employed in the monitoring program, of laboratory methods and procedures used, and criteria for appraising the suitability of water for drinking, irrigation, and industrial uses. Appendix B presents tabulations of all mineral and radiological analyses of samples collected in this program during 1959, and available data on ground water monitoring wells.



STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
PART II SOUTHERN CALIFORNIA

MONITORED AREAS
1959

SCALE OF MILES
10 0 10 20 30 40 50

1962

PLATE I

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3-12 SANTA MARIA RIVER VALLEY

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4-11.02 WEST COAST BASIN
SANTA MONICA BAY AREA
HAWTHORNE-GARDENA AREA
TORRANCE AREA

4-11.03 CENTRAL BASIN PRESSURE AREA
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STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
PART II SOUTHERN CALIFORNIA

MONITORED AREAS
1959

SCALE OF MILES
10 0 10 20 30 40 50

1962

QUALITY OF GROUND WATERS IN SOUTHERN CALIFORNIA, 1959

The mineral quality of ground water in Southern California during 1959 reflected the much below normal rainfall in the 1958-1959 precipitation season. The improvement in ground water quality noticeable in some basins following the more plentiful rainfall in the 1957-1958 season was reversed by quality changes induced by the dry weather.

Increased demands on ground water supplies due to lack of rain was accompanied by a general lowering of ground water levels. The lowered water tables, or pressure surfaces, accentuated previously existing degradational effects on water quality exerted by salt water intrusion, by inflow of poor quality waters from rocks and sediments adjacent to or underlying some valley fill areas, and by discharges of waste waters to areas susceptible to percolation of these wastes to the underlying ground water bodies. No new sources of degradation were discovered during 1959.

Although considerable quantities of imported water were used to replenish the ground water supplies, there were no monitored areas where the influence of such recharge on the ground water quality was evident in 1959.

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Central Coastal Region (No. 3)

The Central Coastal Region includes all of the coastal drainage areas from the southern boundary of Pescadero Creek Basin in San Mateo County to the southeastern boundary of Rincon Creek Basin in Ventura County. It extends inland an average of about 50 miles to the crest of the coastal mountain ranges, and encompasses an area of approximately 11,000 square miles. The region is characterized by narrow coastal plains and coastal valleys with moderate slopes toward the ocean, backed by rugged mountain ranges paralleling the coast.

Valley areas in this region depend largely on ground water as a source of supply, and approximately 90 percent of the water requirements are met by ground water pumping. Nineteen ground water basins have been identified in this region, of which 18 are utilized intensively to supply irrigation water. Six ground water basins in this region have been included in the statewide ground water monitoring program. These areas, the number of monitored wells in each, and the sampling times are listed in the following tabulation.

Monitored area	Number of wells	Sampling time
Pajaro Valley (3-2)*		
Gilroy-Hollister Basin (3-3)*		
Salinas Valley (3-4)*		
Carmel Valley (3-7)*		
Santa Maria River Valley (3-12)	27	April and September
Cuyama Valley (3-13)	10	April and September

* These ground water basins are located in Northern and Central California and are discussed in Part I of this bulletin.

The quality of ground water in the monitored areas covered by Part II of this report showed no significant variations in 1959 in comparison with previously existing conditions.

Santa Maria River Valley (3-12)

The Santa Maria River Valley is located along the San Luis Obispo and Santa Barbara County line. The basin extends 28 miles inland from the ocean and includes an area of about 180 square miles. The basin boundaries are shown on Plate 2, "Santa Maria River Valley."

Ground Water Occurrence. The chief sources of ground water are the unconsolidated sediments of Pleistocene and Recent age; namely, the Paso Robles formation, the Orcutt formation, and the Recent alluvium. Santa Maria River Valley Basin is a free ground water basin except in the western portion, where sufficient fine grained alluvium accumulated to form a confining cap. Waters overlying the confining cap are either perched or semiperched. Well yields are low near the perimeter of the valley, increasing toward the center. Yields from wells range from less than 100 to 3,000 gpm and average about 1,000 gpm.

Ground Water Development and Use. Ground water is extensively developed in Santa Maria River Valley and supplies all water requirements for irrigation, domestic, and industrial uses.

Major Waste Discharges. Brine wastes from oil production and effluents from sewage treatment plants constitute the major waste discharges in the Santa Maria Valley. Although almost all of the oilfield brine wastes are discharged to the ocean by pipeline, the possibility of pollution of ground water by oil wastes through spillage, defective casings, or permeable sumps still remains. All of the sewage effluents in this area are disposed to ponds from which some is used for irrigation. The effluents are discharged in an area of high permeability and constitute an involuntary replenishment of the free ground water body.

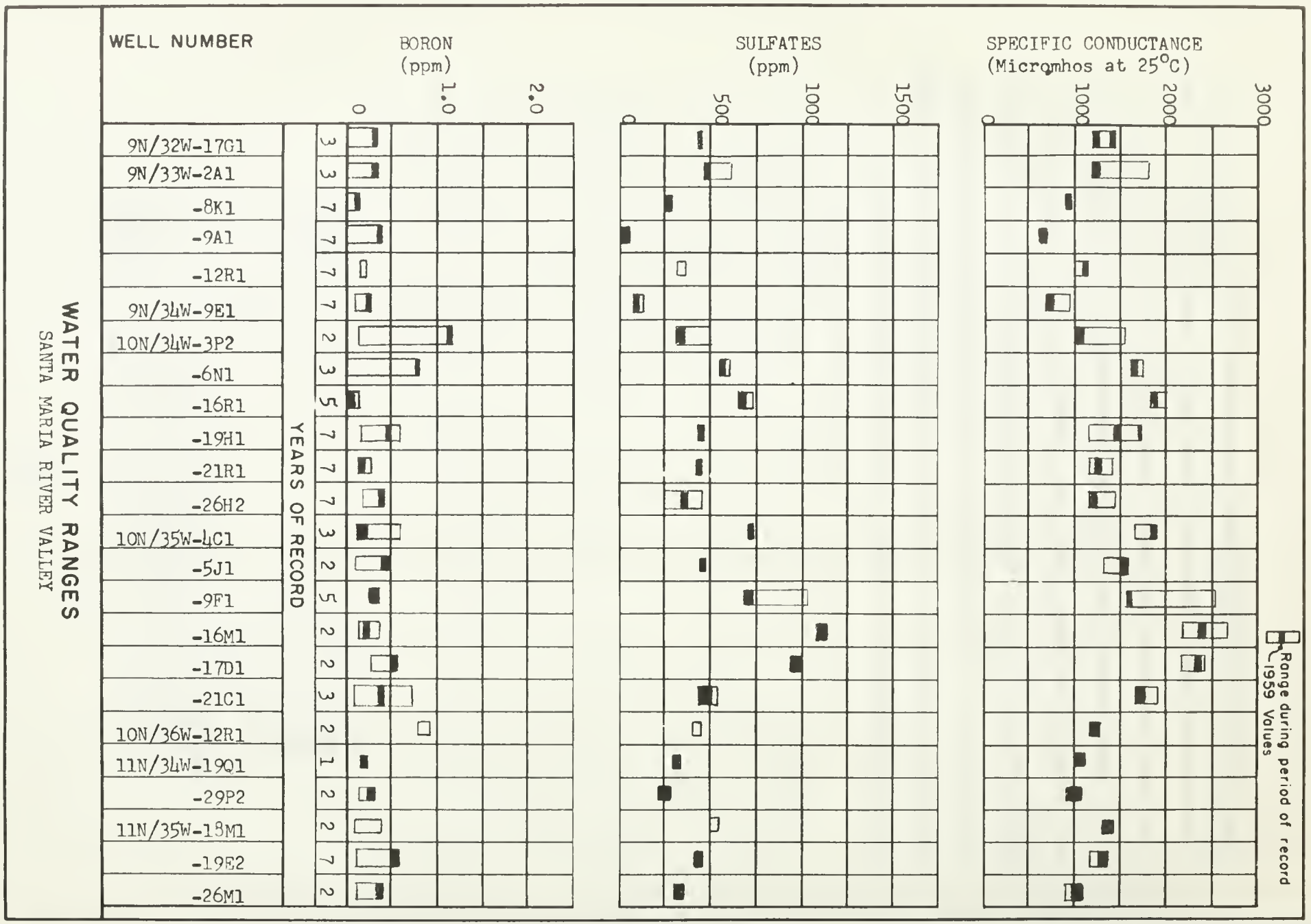
Monitoring Program. The monitoring program was initiated in this area in 1953 to detect changes in ground water quality which might result from surface disposal of oil industry wastes. Sampling well coverage originally encompassed practically all water wells in the areas of oil production, which are located in the eastern or upper end of the valley. In 1957, wells in the coastal region were added to monitor an area where sea-water intrusion may become a problem. Under a cooperative arrangement between the department and the United States Geological Survey initiated in 1957, the Geological Survey assumed the task of ground water sampling. In 1959, 43 analyses were obtained from 27 monitored wells.

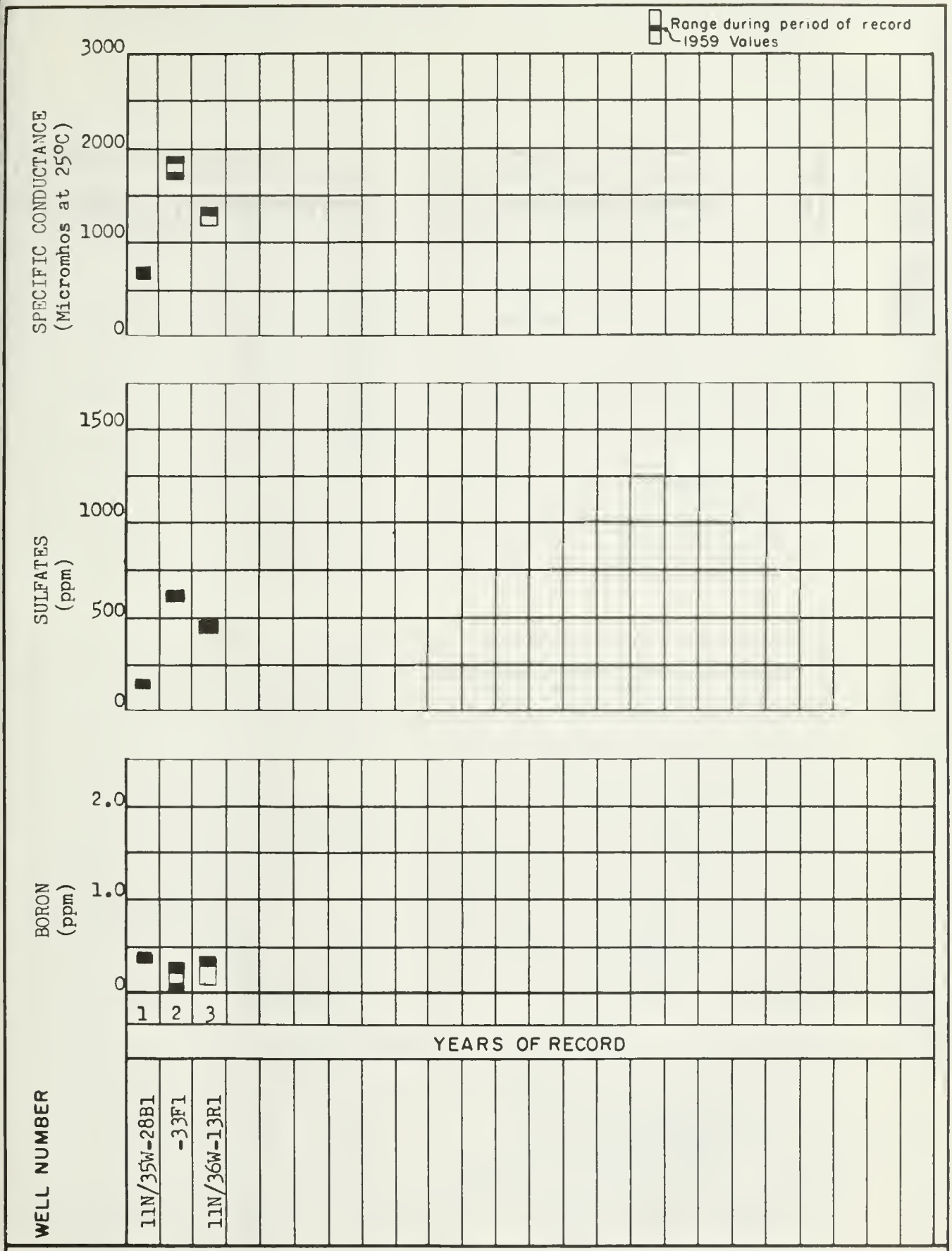
Evaluation of Water Quality. Analyses of ground water from Santa Maria River Valley wells in 1959 indicated a nearly uniform character of water throughout the basin, predominantly calcium-magnesium sulfate in type. The waters were exceedingly hard, and sulfates usually greatly exceeded the recommended limit of 250 ppm for drinking water. Analyses of ground water from wells located in the coastal region of the Santa Maria River Valley Basin failed to show evidence of sea-water intrusion in 1959. There was, however, a rather widespread area of high nitrate ground waters in the central portion of the basin. Ranges for significant mineral constituents in 1959 were as follows:

Total dissolved solids	401 to 2,267 ppm
Chlorides	24 to 160 ppm
Sulfates	7 to 1,172 ppm
Total hardness	96 to 1,218 ppm
Boron	0.16 to 1.11 ppm
Percent sodium	17 to 39*

*Excluding the analysis of water from well 9N/33W-9A1, located approximately four miles east of the City of Orcutt, which showed 63 percent sodium. This well supplies water of good quality which is used for domestic purposes.

Significant Water Quality Changes. Comparison of 1959 analyses with those of the preceding years indicates fluctuations in mineral content of ground water during the seven year period, with little indication of a basin-wide trend. Water from well 10N/34W-19H1, located approximately three miles west of the City of Santa Maria, is an exception. It has exhibited a slight, but continuous, increase in total dissolved solids and chloride content each year. The chloride content of the waters from this well increased from 43 ppm in 1955 to 94 ppm in 1958 and to 97 ppm in 1959. Local disposal of sewage waste waters to the land appears to be the cause.

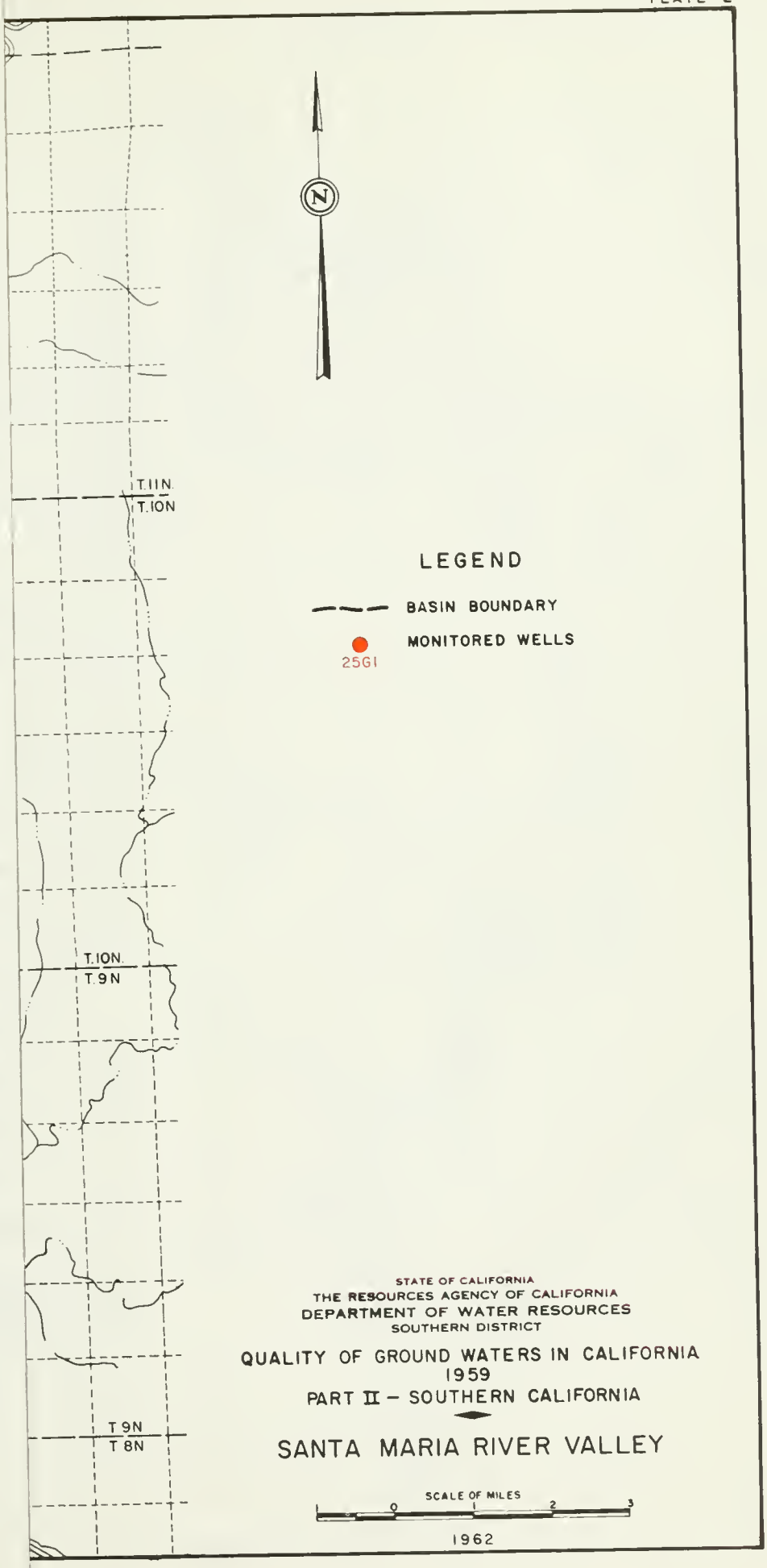

WATER QUALITY RANGES
SANTA MARIA RIVER VALLEY
WELL NUMBER
BORON (ppm)
0
1.0
2.0
SULFATES (ppm)
0
500
1000
1500
SPECIFIC CONDUCTANCE (Micromhos at 25°C)
0
1000
2000
3000
YEARS OF RECORD
9N/32W-17G1 3
9N/33W-2A1 3
-8K1 7
-9A1 7
-12R1 7
9N/34W-9E1 7
10N/34W-3P2 2
-6N1 3
-16R1 5
-19H1 7
-21R1 7
-26H2 7
10N/35W-4C1 3
-5J1 2
-9F1 5
-16M1 2
-17D1 2
-21C1 3
10N/36W-12R1 2
11N/34W-19Q1 1
-29P2 2
11N/35W-18M1 2
-19E2 7
-26M1 2
Range during period of record
1959 Values



WATER QUALITY RANGES
SANTA MARIA RIVER VALLEY

FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

SANTA MARIA RIVER VALLEY



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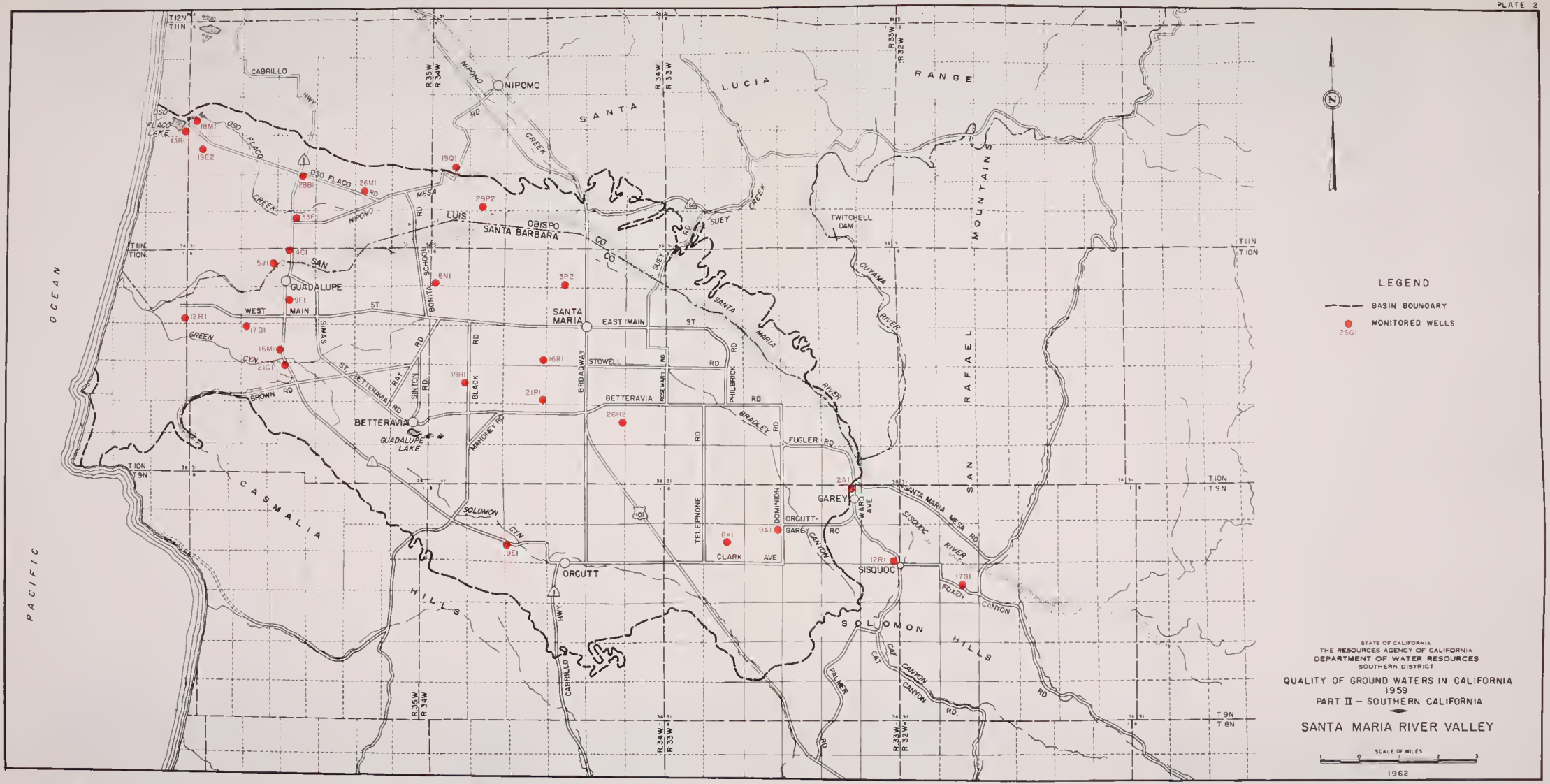
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II – SOUTHERN CALIFORNIA

SANTA MARIA RIVER VALLEY

1962


PACIFIC OCEAN
NIPOMO
SANTA LUCIA RANGE
SAN RAFAEL MOUNTAIN
CASMALIA HILLS
SOLOMON HILLS
GUADALUPE
SANTA MARIA
BETTERAVIA
ORCUTT
GAREY
SISQUOC
TWITCHELL DAM
GUADALUPE LAKE
OSO FLACO LAKE
CABRILLO HWY
NIPOMO CREEK
OSO FLACO CREEK
SANTA MARIA RIVER
SISQUOC RIVER
CUYAMA RIVER
SUEY CREEK
GREEN CYN.
BROWN RD.
SOLOMON CYN.
GAREY CANYON
FOXEN CANYON
CAT CANYON
PALMER RD.
SANTA MARIA MESA RD.
FUGLER RD.
STOWELL RD.
BRADLEY RD.
CLARK AVE.
LEGEND
BASIN BOUNDARY
MONITORED WELLS
25G1
STATE OF CALIFORNIA
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QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II – SOUTHERN CALIFORNIA
SANTA MARIA RIVER VALLEY
SCALE OF MILES
1962

Cuyama Valley (3-13)

The Cuyama Valley ground water basin is located along the Cuyama River in the southeast corner of San Luis Obispo County and the northeast corner of Santa Barbara County. It includes portions of Kern and Ventura Counties also. The basin extends about 35 miles along the Cuyama River ranging in width from one to four miles and encompasses about 125 square miles; boundaries are shown on Plate 3, "Cuyama River Valley."

Ground Water Occurrence. Unconsolidated clay, silt, and gravel, 3,000 to 4,000 feet in total thickness, compose the alluvium, terrace, and older continental deposits that supply nearly all the ground water in this area. The alluvium of Recent origin is most important in the western part of the basin, whereas the older deposits are important in the eastern portion; however, many wells are perforated in both. Except for small areas in the south central part, the ground waters are considered to be unconfined. Well yields range from less than 600 gpm to 4,400 gpm and average about 1,000 gpm. The yield of wells is least in the south central portion of the valley, while the higher yields are obtained from wells in the older continental deposits in the eastern portion of the basin.

Ground Water Development and Use. Ground water in the Cuyama Valley has been extensively developed for irrigation needs. More recently, minor development has taken place for relatively new oil industry and expanding domestic requirements. Ground water supplies most of the local needs.

Major Waste Discharges. Oil industry wastes constitute the largest disposal problem in Cuyama Valley. Although the majority of these wastes are discharged to injection wells, ground water could be polluted by

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Major Waste Discharges. Oil industry wastes constitute the largest disposal problem in Cuyama Valley. Although the majority of these wastes are discharged to injection wells, ground water could be polluted by

spillage, defective casings, or improper sump disposal. Waters from many springs and seeps, although not waste discharges, must be considered as possible degradents to ground water quality, since available data indicate that they are much inferior in quality to ground waters obtained from wells.

Monitoring Program. The ground water monitoring program in Cuyama Valley was established in 1953 to detect possible impairment of ground water quality by oil industry wastes and mineralized springs, principally in the northern and northwestern part of the basin. Through a cooperative arrangement in which the United States Geological Survey assumed the task of ground water sampling in 1957, 17 samples were obtained from 10 monitored wells and a group of three springs during 1959.

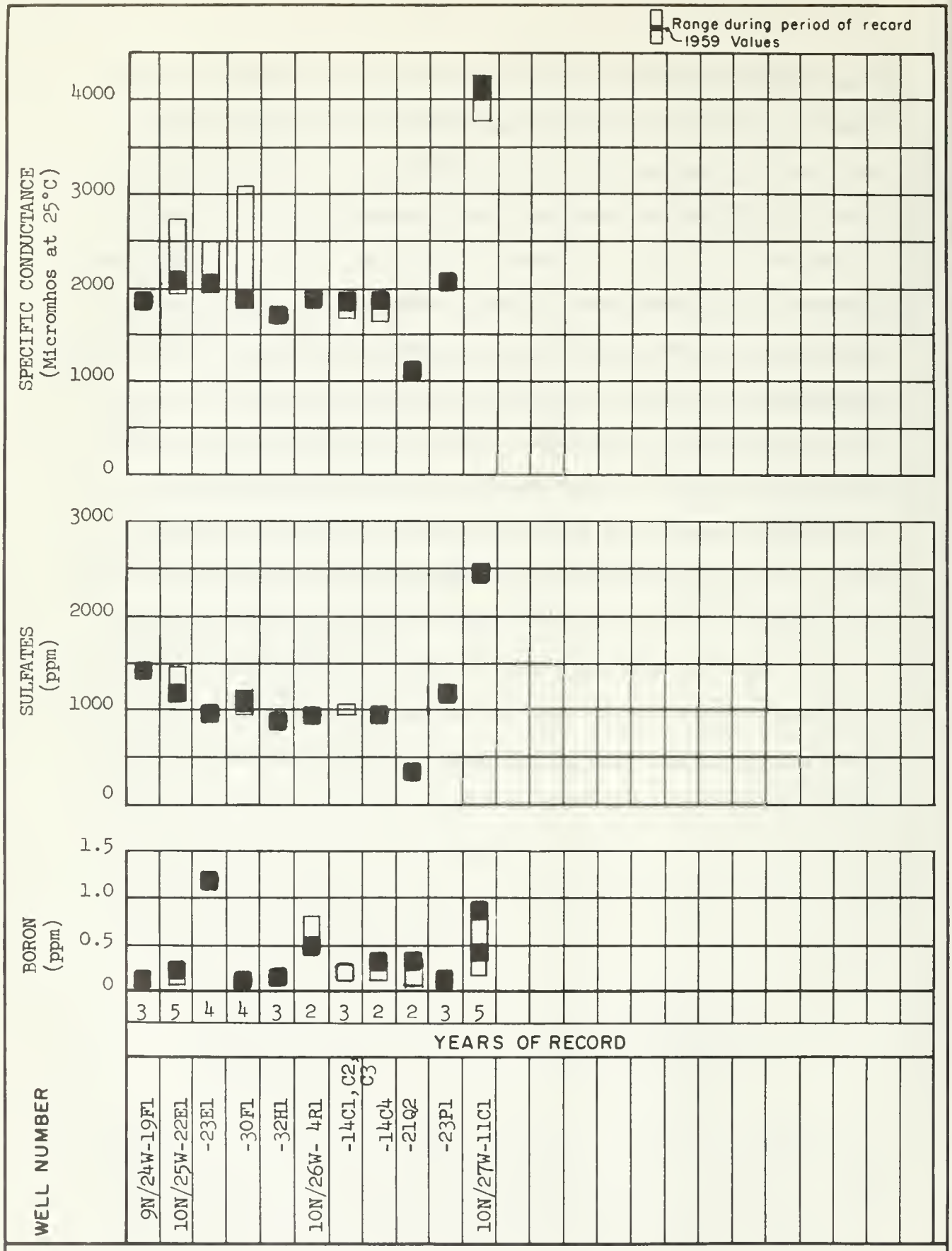
Evaluation of Water Quality. The character of the ground water is generally calcium sulfate or calcium-magnesium sulfate. The water is of inferior quality for domestic uses because it is excessively high in sulfates and total dissolved solids, and is extremely hard. The ground waters are low to moderate in boron content and percent sodium. Although total mineral content is quite high, the water is used successfully for irrigation of a variety of crops. The analyses show the following ranges of important mineral constituents:

Total dissolved solids	910 to 4,289 ppm
Chlorides	17 to 115 ppm
Sulfates	446 to 2,529 ppm
Total hardness	332 to 2,258 ppm
Boron	0.02 to 1.23 ppm
Percent sodium	14 to 49

Significant Water Quality Changes. A study of analyses of samples collected during 1959 indicates that with exceptions, as noted below, only minor variations in mineral quality have occurred in this period.

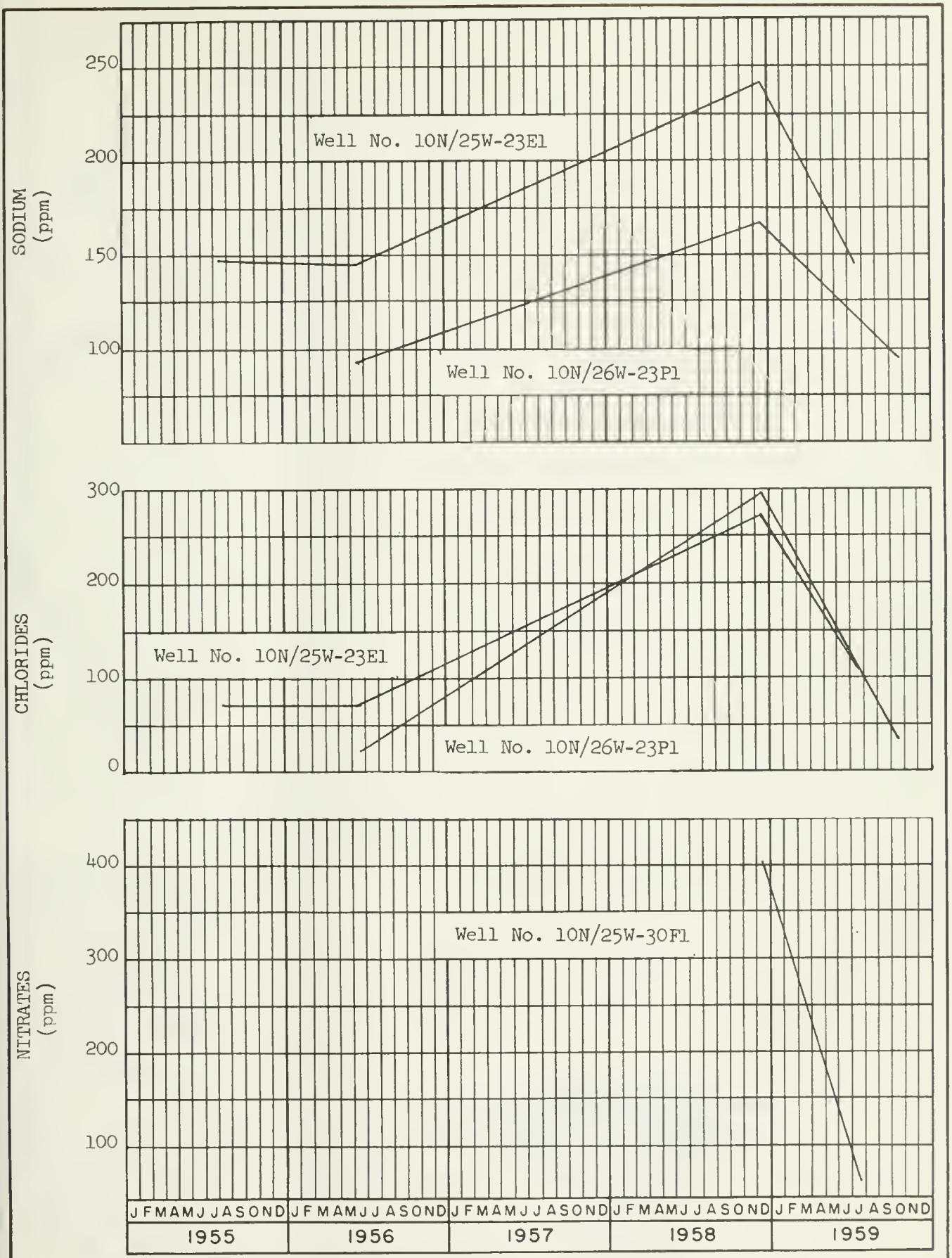
During the period December 1958 through July 1959, analyses of samples from well 10N/25W-23E1, located approximately 0.8 mile west of the intersection of Highways 166 and 399, show a decrease in sodium content from 239 to 145 ppm, and although chloride showed a decrease from 278 to 115 ppm, the latter figure represents the highest chloride content found in Cuyama Valley ground water in 1959. Analyses of water from well 10N/26W-23P1, located approximately three miles southeast of Cuyama Ranch headquarters, exhibited similar characteristics during this period in that sodium decreased from 166 to a more normal 96 ppm and chlorides decreased from 294 to 34 ppm. Analyses of a sample from well 10N/25W-30F1 located about 0.9 mile south of Cuyama School showed a decrease from an extremely high nitrate content of 415 ppm in December 1958 to 58 ppm in July 1959. Water from this well is used for irrigation.

Comparison of ground water analyses for 1959 with those of the previous six years shows a return to the mineral quality of the earlier years of record after temporary general increases in mineral content in the year 1958.

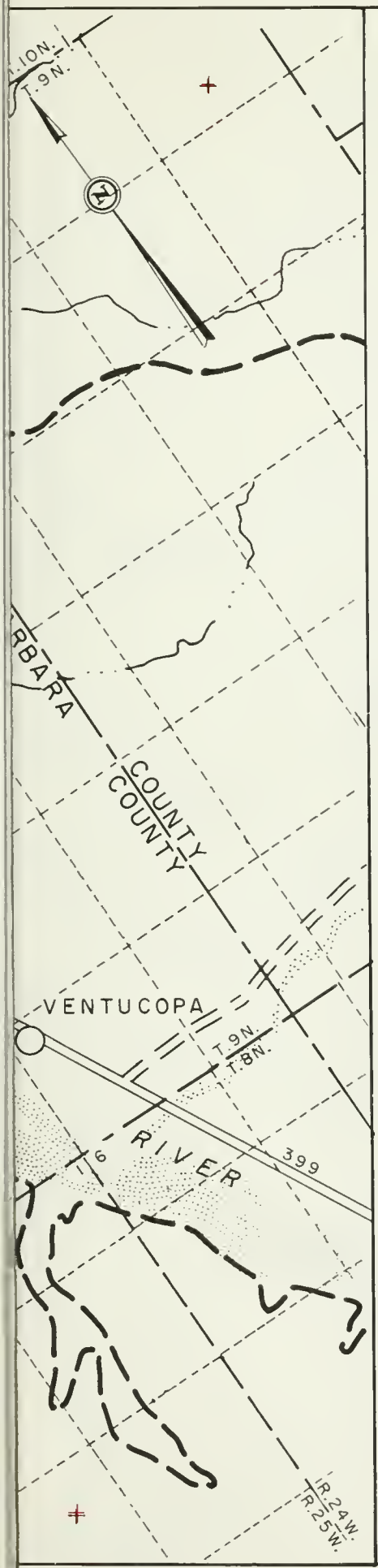


WATER QUALITY RANGES

CUYAMA VALLEY



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS
CUYAMA VALLEY



LEGEND

BASIN BOUNDARY

MONITORED WELL

11C1

FAULT LINE

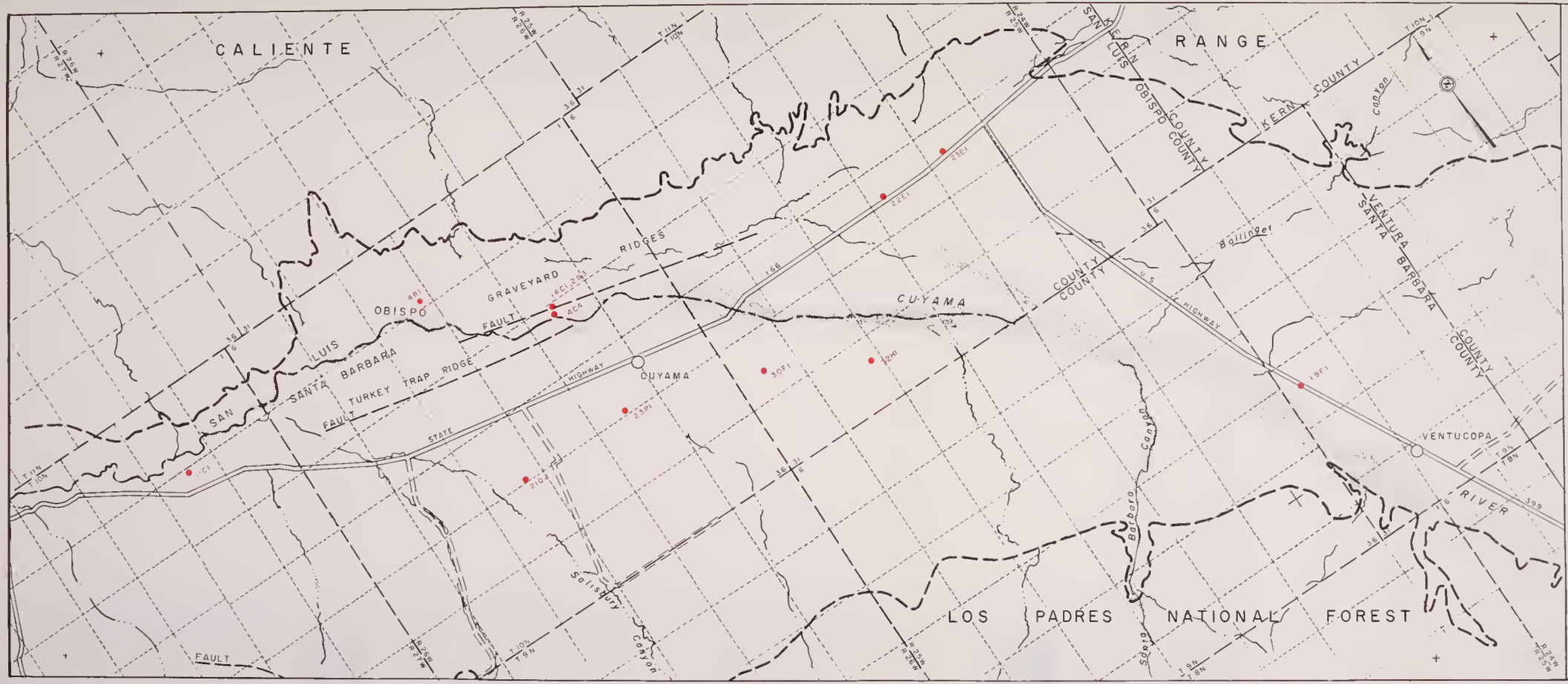
STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II SOUTHERN CALIFORNIA

CUYAMA RIVER VALLEY

SCALE OF MILES
½ 0

1962



LEGEND

- BASIN BOUNDARY
- MONITORED WELL
- FAULT LINE

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II SOUTHERN CALIFORNIA

CUYAMA RIVER VALLEY

SCALE OF MILES
0 ½ 1

1962

Los Angeles Region (No. 4)

The Los Angeles Region extends from the southeastern boundary of the watershed of Rincon Creek in Ventura County to the Los Angeles-Orange County boundary, a distance of about 100 miles. It extends inland from the Pacific Ocean to the crest of the coastal mountains, an average distance of 50 miles, and encompasses an area of about 4,600 square miles in Ventura and Los Angeles Counties. The region is characterized by broad coastal plains and inland valleys, backed by rugged mountainous topography. Ventura, Santa Clara, Los Angeles, and San Gabriel Rivers are the principal streams in this region.

The ground water supply of the region has been extensively developed, and in many areas has been exploited beyond the point of safe annual yield. Supplemental water is imported from Mono and Owens Valleys to the City of Los Angeles, and from the Colorado River to areas within the Metropolitan Water District of Southern California. Ground water, however, still supplies about 50 percent of the water beneficially used in this large and rapidly growing metropolitan area.

Sixteen ground water basins, and 53 subbasins, have been identified in the Los Angeles Region. The following five basins, subbasins, or areas, have conditions warranting their inclusion in the monitoring program:

Monitored area	Number of wells	Sampling time
Oxnard Plain Basin (4-4.01)	18	Spring and fall
West Coast Basin (4-11.02)		
Santa Monica Bay area	18	Spring and fall
Hawthorne-Gardena area	6	April and October
Torrance area	6	April and October

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Torrance area	6	April and October

Monitored area	Number of wells	Sampling time
Central Basin Pressure Area (4-11.03) and Los Angeles Forebay Area (4-11.04)	4	May and December
Main San Gabriel Basin (4-13.01)	7	May and December

Less than normal precipitation in the 1958-1959 season induced increased extraction of ground water throughout the region. Ground water levels showed a general decline in 1959, and were lower than those of 1958. A general small increase of mineral content of well waters in 1959 was noticed in inland areas, following the improvement of water quality resulting from greater than normal precipitation in the 1957-1958 season.

Along the coastal margins of the Oxnard Plain Basin in Ventura County and the West Coast Basin in Los Angeles County, the ground water pressure surface sloped downward from sea level to elevations of 50 to 100 feet below sea level at points five to ten miles inland. This landward slope made possible the continued intrusion of sea water into fresh ground water aquifers of these basins. In the West Coast Basin efforts to halt sea-water intrusion and to artificially replenish underground reservoirs with imported water were reinforced by the organization of a water replenishment district covering the Los Angeles County Coastal Plain.

No new pollution sources were found in 1959, and pollution effects were generally less noticeable than in previous years of record, due mainly to local governmental control of industrial waste disposal practices in the past few years.

Oxnard Plain Basin (4-4.01)

The Oxnard Plain Basin underlies a flat, gentle sloping plain, roughly triangular in shape, comprising about 73 square miles of the coastal portion of Ventura County. The basin borders the Pacific Ocean for a distance of about 16 miles and is bounded on the north by the Santa Clara River, and on the southeast by foothills of the Santa Monica Mountains. The boundaries of the basin are shown on Plate 4, "Oxnard Plain Basin."

Ground Water Occurrence. Continental and marine sediments are the chief sources of ground water in this area; however, a few wells are supplied from fractured Tertiary volcanic rocks. The main water-bearing zones from the shallowest downward are the Oxnard, the Mugu, the Hueneme, and the Fox Canyon aquifers. All of these aquifers are believed to be open to the sea. Along the coastal portion of the basin the aquifers are confined. A semiperched ground water body consisting chiefly of poor quality return irrigation water exists in the western portion of the basin near Oxnard. The yield of wells in the Oxnard Plain Basin ranges from 900 to 1,100 gpm.

Ground Water Development and Uses. Ground water has been extensively developed to the point of serious overdraft. It is the primary water supply for irrigation, municipal, and industrial uses in the area.

Major Waste Discharges. The major waste discharges in the Oxnard Plain Basin are domestic sewage and industrial waste waters. These wastes are discharged to the ocean by pipeline after treatment in sewage treatment plants located in Oxnard and Port Hueneme.

Monitoring Program. The monitoring program in Oxnard Plain Basin was initiated in 1953 to observe changes in the quality of ground water produced by, and to determine the extent of, sea-water intrusion in the

vicinity of Port Hueneme and Point Mugu. In 1959, the program included the analyses of 37 samples of ground water from 18 monitored wells.

Evaluation of Water Quality. Permeable deposits overlying the clay cap which confines the Oxnard Aquifer in the pressure area contain poor quality waters consisting chiefly of irrigation return water. The character is similar to that in deeper aquifers, but high concentrations of soluble minerals render it unsuitable for domestic use, and class 2 or 3 for irrigation use. A drainage system has been constructed to discharge this water to the ocean. There is no evidence at present (1959) that these perched waters have penetrated the deeper aquifers, but this may possibly occur if ground water levels become sufficiently lowered to create nonpressure conditions.

Available analyses show a similarity in character of waters in the Oxnard, Mugu, Hueneme, and Fox Canyon aquifers. The character is calcium to calcium-sodium sulfate usually, and calcium-magnesium sulfate in limited areas. In areas of sea-water intrusion, the character of the waters shifts to sodium chloride.

Ground waters from the Fox Canyon aquifer are slightly higher in total dissolved solids than Oxnard aquifer waters. However, boron is higher in the Oxnard aquifer waters placing them in class 2 for irrigation use. The ground waters of all these deeper aquifers generally exceed drinking water standards for total dissolved solids and sulfate content. Electrical conductance data place these waters predominantly in class 2 for irrigation use. In 1959, the mineral content of waters in the forebay area and contiguous portions of the pressure area was greater than that of waters in the main part of the basin. This higher

mineral content in the forebay areas reflected the surface recharge water quality.

In general the ground waters in Oxnard Plain area are suitable for irrigation of most crops except those sensitive to boron. The waters are very hard and considered marginal for domestic use because of their high sulfate content.

The analyses of the ground waters of the Oxnard Plain Basin show the following ranges for important mineral constituents:

Total dissolved solids	716 to 19,210 ppm
Chlorides	36 to 8,810 ppm
Sulfates	207 to 1,349 ppm
Total hardness	303 to 5,350 ppm
Boron	0.25 to 1.88 ppm

Significant Water Quality Changes. Comparison of analyses of well waters sampled in 1959 with those of the six preceding years indicates that the only significant mineral quality variations have occurred in areas of sea-water intrusion. The status of sea-water intrusion in the Oxnard Plain Basin in 1959 is presented in Plate 4. The lines of equal chloride concentration indicate that sea-water intrusion into the fresh water aquifers of the basin continues in two apparently separated areas, one in the vicinity of Point Hueneme and the other near Mugu Lagoon.

In the Port Hueneme area between Hueneme Road and Pleasant Valley Road, the 500 ppm line of equal chloride concentration advanced eastward as much as 900 feet beyond the corresponding line for 1958. To the west of Ventura Road there is no evidence indicating significant northward movement of the sea-water intrusion front during the year. The water from well 1N/22W-20B1, located approximately seven-tenths of a mile northwest of Port Hueneme has retained a relatively unchanged mineral quality over the years. This well was

formerly believed to produce water from the Oxnard aquifer and therefore influenced the plotting of the isochlor lines shown on the map prepared for the year 1958. This well is now believed to produce water from zones below the Oxnard aquifer. As a result, the isochlor line in this area has been adjusted northwestward, based on data from adjacent wells, and does not necessarily represent an advance of sea water during the past year in this direction.

The maximum landward advance of the 500 ppm isochlor in the vicinity of Port Hueneme remains at about 1.8 miles, but the intruded area has expanded laterally. Analyses of water from well 1N/22W-20R1, located one-third of a mile west of the City of Port Hueneme, showed a chloride content of 23 to 43 ppm in the early months of 1951, which increased to 8,900 ppm in November 1956, and decreased to 5,840 ppm in May 1959. Analyses of water from well 1N/22W-28A2 showed continuous chloride increases from 49 ppm in December 1956, to 71 ppm in December 1957, and to 283 ppm in May 1959. Similar increases were evident in the majority of wells in the intruded area. Many wells producing native quality waters in the Saviers Road area are showing initial indications of increasing chlorides.

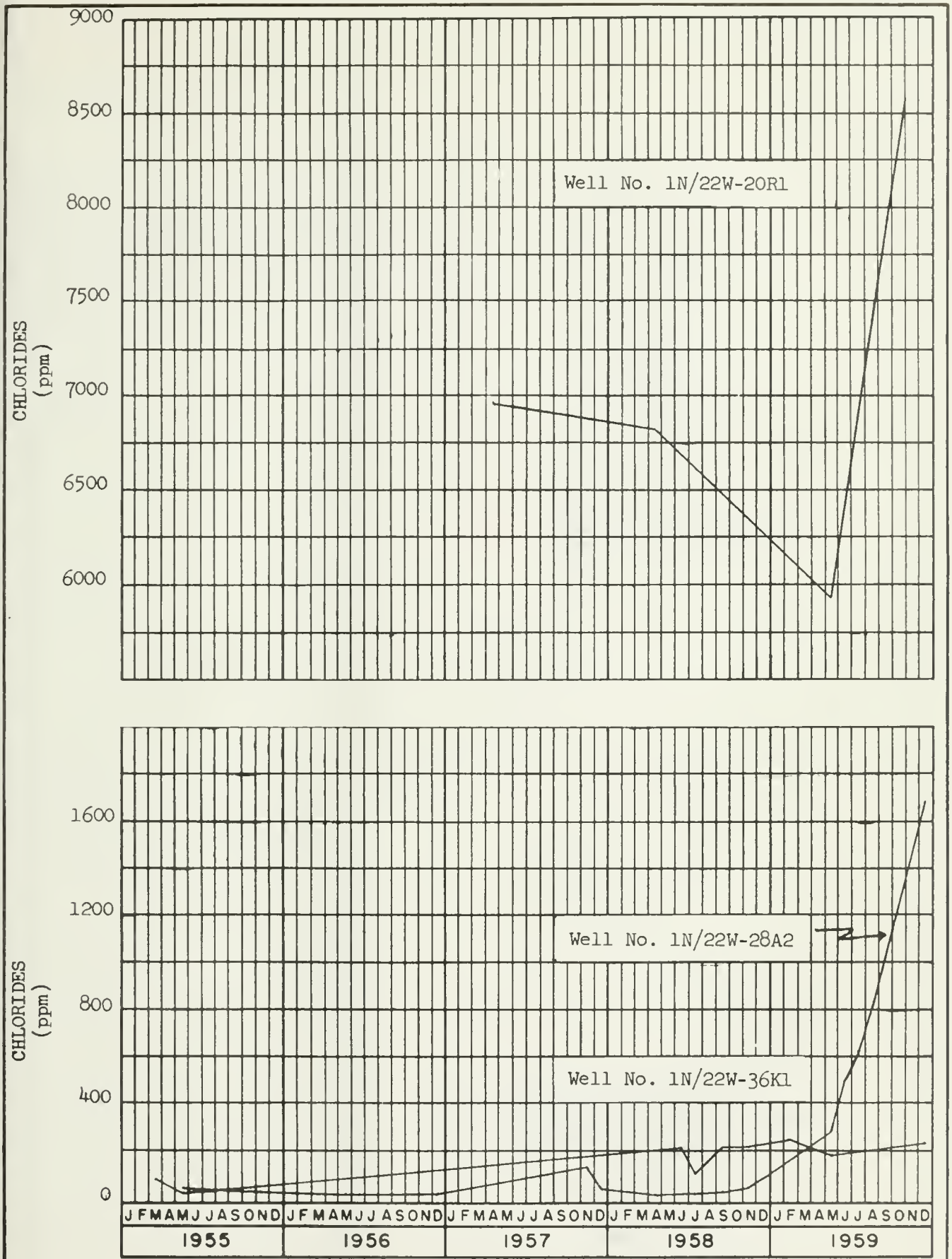
Between Port Hueneme and Point Mugu Lagoon, the chlorides increased noticeably in two areas. Wells in the vicinity of duck ponds in this area showed chlorides increasing slowly but continuously. Ground water from well 1N/22W-36K1, located approximately one-half mile southwest of the duck ponds, has increased in chloride concentration from 58 ppm in 1952 to 225 ppm in 1959. The water from well 1N/22W-36K3, located in the duck ponds, had a chloride content of 1,837 ppm in November 1959.

An increase in chlorides in the ground water from several wells has been detected in an area of about one square mile south and west of Hueneme and Arnold Roads. The reason for the increase has not as yet been determined.

In the vicinity of Mugu Lagoon, the definite location of isochlor lines cannot be established, due to the absence of wells in key areas, and the lack of samples of ground water from some available (but nonsampleable) wells. The 500 ppm isochlor line for 1959 on Plate 4 is located at approximately the same position as in 1958.

WATER QUALITY RANGES

OXNARD PLAIN BASIN



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS
OXNARD PLAIN BASIN

LEGEND

BASIN BOUNDARY

MONITORED WELL

29F1

AREA OF CHLORIDE CONCENTRATIONS GREATER THAN 500 PPM SPRING OF 1959

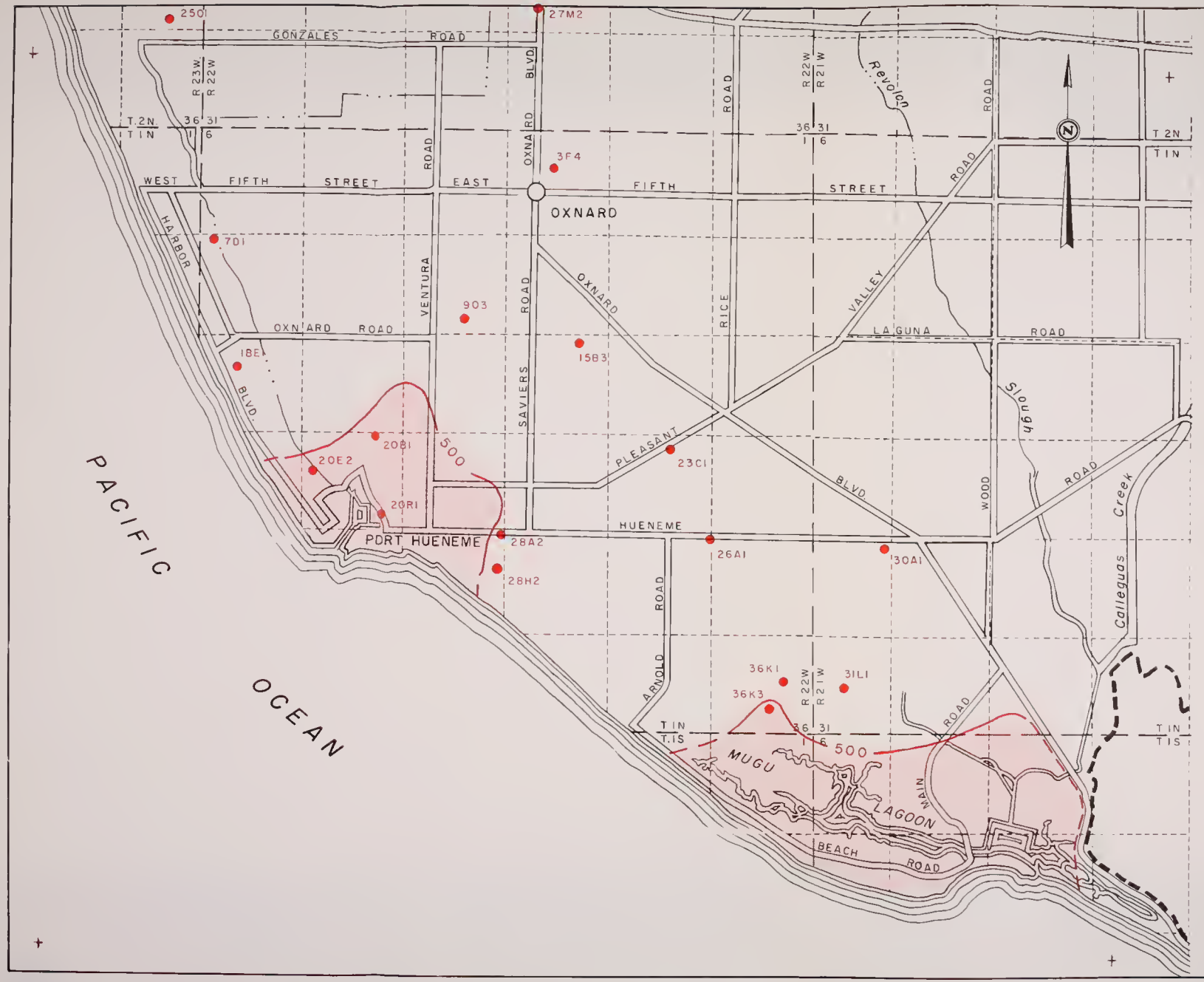
STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II SOUTHERN CALIFORNIA

OXNARD PLAIN BASIN

SCALE OF MILES
1 ½ 0 1

1962



LEGEND

- BASIN BOUNDARY
- MONITORED WELL (29F1)
- AREA OF CHLORIDE CONCENTRATIONS GREATER THAN 500 PPM SPRING OF 1959

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II SOUTHERN CALIFORNIA

OXNARD PLAIN BASIN

SCALE OF MILES
½ 0 1

1962

West Coast Basin (4-11.02)

West Coast Basin is located in the southern part of Los Angeles County along the coast between the Cities of Santa Monica and Long Beach. It is about 19 miles long, has an average width of 9 miles, and includes an area of about 160 square miles. About 80 percent of the surface is a gently rolling, slightly eroded marine plain, while bordering highlands constitute the remainder. Basin boundaries are shown on Plate 5, "West Coast Basin."

Ground Water Occurrence. The principal water-bearing deposits are of Pleistocene and Recent age and consist of alternating layers of relatively fine grained and coarse grained fluvial sediments. The coarse grained layers yield ground water readily to wells and are the producing aquifers of the basin. These aquifers can conveniently be divided into an upper and a lower group.

The upper group of aquifers consists of an area of semiperched ground water in the central portion of the basin and the Gaspur, Gardena, and Gage aquifers. The ground water production from this group is of diminishing importance because the water quality is generally marginal or unsuitable for established beneficial uses.

The lower group is composed of the Lynwood and Silverado aquifers. These aquifers contain ground water of good quality and continue to supply a large part of local water needs.

Along the Santa Monica Bay, both groups merge to form essentially one aquifer which outcrops in the floor of the bay. In this area sea-water intrusion of the fresh ground water supply has occurred.

Depths to the aquifers vary from 50 to 1,200 feet. Yield of wells ranges from 300 to 2,000 gpm, and averages about 500 gpm.

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Depths to the aquifers vary from 50 to 1,200 feet. Yield of wells ranges from 300 to 2,000 gpm, and averages about 500 gpm.

Ground Water Development and Use. Ground water is extensively developed in the West Coast Basin, supplying agricultural, industrial, and domestic requirements. Cultural development has changed over the last 20 years from typically agricultural to metropolitan and industrial. Petroleum production, oil refining, aircraft manufacture, and related industries are concentrated in the basin. Ground water supplies about 40 percent of the water requirements of the basin, the rest is provided by imported water.

Major Waste Discharges. The major waste discharges in the West Coast Basin are oil wastes from the large oil fields and refineries in the area, and industrial and domestic sewage. Although most of the oil wastes are discharged to the ocean by pipeline, the problem of possible degradation of ground water through defective casing, spillage, or use of sumps still exists. Industrial and domestic sewage is treated at sewage plants and discharged to the ocean.

Monitoring Program. The sampling program in the West Coast Basin monitors the ground water quality in the area of sea-water intrusion along Santa Monica Bay and two areas where industrial waste discharges would have an effect on ground water quality, namely, the Hawthorne-Gardena area and the Torrance area. Each of these areas is discussed separately in the presentation that follows.

Santa Monica Bay Area. The area monitored for sea-water intrusion borders the coastline of Santa Monica Bay. Wells selected for the monitoring program are situated in an area of about 15 square miles, from the northerly limit of the City of El Segundo southward to the vicinity of the City of Redondo Beach. The monitoring program consists of 18 wells from

which 31 water samples were obtained in 1959. Obtaining water samples from the same well over a long period of time has presented a problem in this area because soon after a well shows prominent effects of salt-water intrusion, it is generally removed from use by the owner, and routine sampling becomes impractical. When available, other wells are substituted for those removed from the sampling program. Samples of the water from wells without pumps are obtained periodically by Department of Water Resources and Los Angeles County Flood Control District mobile pumping equipment.

Evaluation of Water Quality. The mineral character of the ground water not influenced by sea-water intrusion is sodium bicarbonate to calcium bicarbonate. In the area of sea-water intrusion, the character of water shifts to sodium chloride. In 1959, the chloride concentration ranged from 82 to 9,800 ppm and total dissolved solids ranged from 432 to 18,270 ppm.

Significant Water Quality Changes. The 1959 chloride data indicate the continued landward advance of the sea-water intrusion front except in the vicinity of the Los Angeles County Flood Control District's barrier project located in the central section of the intrusion front near Manhattan Beach. In this area, the landward movement of sea water is prevented by a pressure ridge maintained at elevations above sea level by injection of fresh water through wells drilled in a line parallel to the coast. The landward slope of the pressure surface has resulted in an inland flow of the injected fresh water which apparently overrides and drives before it that portion of sea water cut off by the injected fresh water as it spreads. Depression of the saline water and possible dilution effects are indicated by decreases of chloride content of water collected from wells in its path. Isochlors shown on the map following, when

compared with the corresponding lines for 1958, show that the injection water mound is rapidly expanding, and that the landward advance has averaged 500 feet in the last year.

Northward from the barrier project, through El Segundo and Playa Del Rey, the ground waters extracted continued to show increases in chlorides in the areas of heavy pumping. In the areas of light pumping, the chloride content remained fairly constant. In the latter areas, water levels along the coast are at or near sea level, and the landward slope of the pressure surface is relatively gentle.

Southward from the barrier project, in the Redondo Beach area, exploratory drilling by the Los Angeles County Flood Control District in 1958 revealed a previously unknown, extensive area of high chloride waters. Well 4S/14W-17F1, for example, located 1.1 miles from the ocean, producing water from the Silverado water-bearing zone, showed 2,370 ppm chlorides in February 1959. The Los Angeles County Flood Control District is planning an extension of the barrier project in this area.

Hawthorne-Gardena Area. This monitored area extends approximately from Florence Avenue, north of the City of Inglewood, to 190th Street on the south, and from Sepulveda Boulevard on the west to Alameda Boulevard on the east. Ground water monitoring in the Hawthorne-Gardena area was initiated in 1953 as a result of a recommendation by a committee of interested local governmental units which conducted a survey of industrial waste disposal in this area under the direction of the Los Angeles Regional Water Pollution Control Board. The monitoring program is designed to detect any degradation of ground water quality which may result from past or present oil well, oil refinery and other industrial wastes discharged to surface

channels and sumps. During 1959, 13 water samples were obtained from six monitored wells in this area.

Evaluation of Water Quality. The character of the ground water varies from calcium bicarbonate to calcium-sodium bicarbonate chloride. The ground water in the deeper zones is moderately hard to very hard, but is suitable for prevailing beneficial uses. Well 3S/13W-31F1, located about one mile southeast of the City of Gardena, produces from a semiperched body of water and yields water of marginal quality. The analysis of a water sample collected from this well in October 1959, showed a chloride content of 326 ppm, the highest for the area. The lowest chloride content in samples from monitored wells in 1959 in the Hawthorne-Gardena area was 25 ppm. Total hardness ranges from 138 to 668 ppm.

Significant Water Quality Changes. A study of analyses of ground water samples collected during 1959 indicates that only minor variations in mineral quality have occurred in this period. However, well 3S/13W-31F1 showed a continual increase in mineral constituents from 1953 to 1957, and a slight decrease in 1958 and 1959. Chloride in water from well 3S/13W-29G3 located about two miles southwest of the City of Compton has continued to increase from 43 ppm in 1953 to 135 ppm in October 1959.

Torrance Area. This monitored area in the West Coast Basin occupies approximately 30 square miles of the coastal plain and is bordered by 190th Street on the north, Pacific Coast Highway on the south, Main Street on the east, and Santa Monica Bay on the west. The monitoring program in this area was instituted at the recommendation of the Los Angeles Regional Water Pollution Control Board following a survey of industrial waste discharges in 1953 and 1954. Ground water quality is monitored

to follow the effects resulting from the past and present disposal of industrial wastes. During 1959, 13 ground water samples were obtained from six monitoring program wells in the Torrance area.

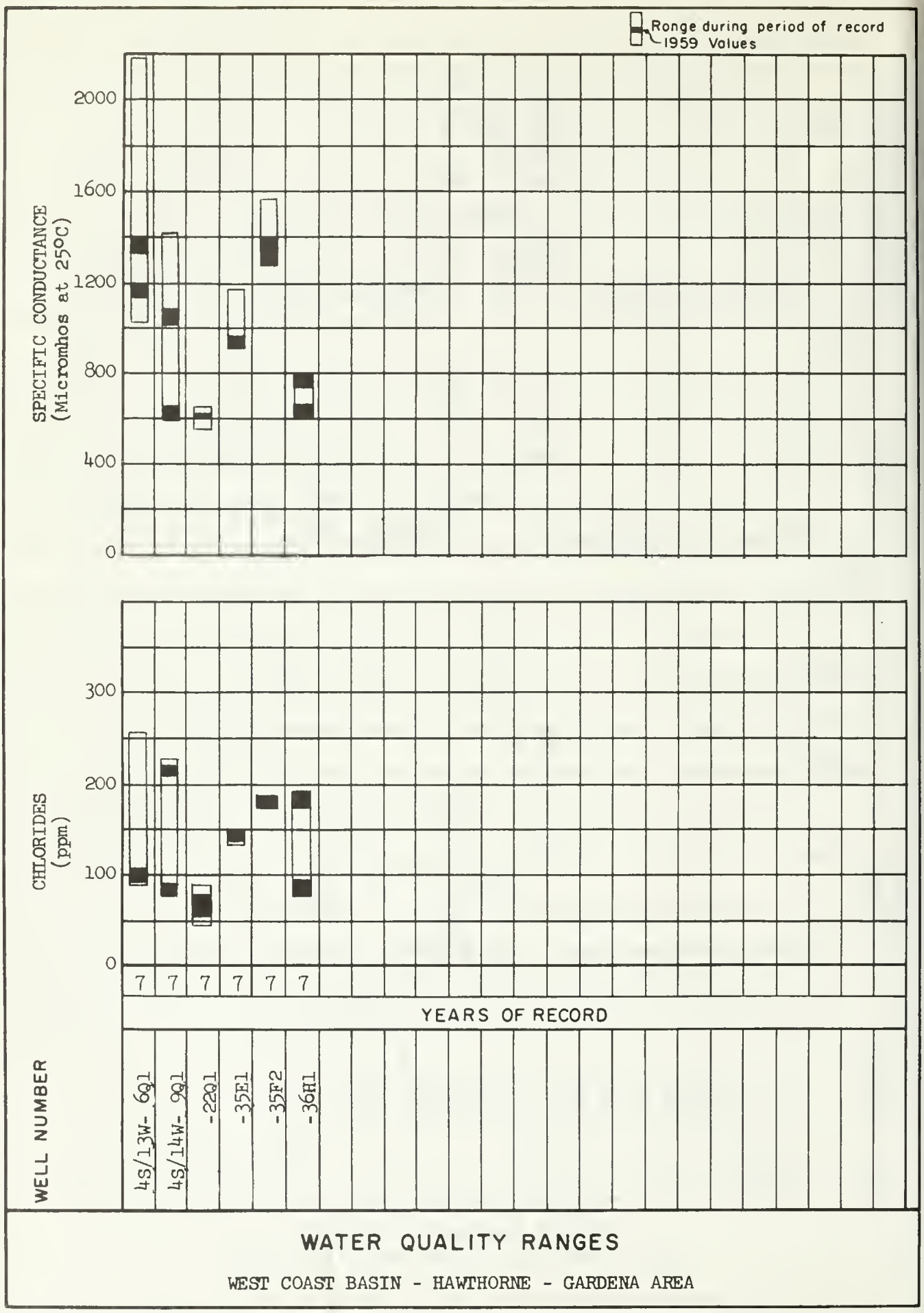
Evaluation of Water Quality. The mineral character of ground water from the Torrance area varies widely. Sodium and calcium are predominant cations, while bicarbonate and sulphate predominate among the anions. Waters in the Gardena aquifer show evidences of local impairment in the eastern part of the monitored area. The ground waters are generally moderately hard to very hard, and range from good to unsuitable for municipal and industrial uses. Ground waters in the deeper aquifers range from good to excellent quality for all beneficial uses.

In 1959, the chloride concentrations ranged from 53 to 218 ppm; sulphates ranged from 2 to 377 ppm; and total hardness ranged from 93 to 448 ppm.

Significant Water Quality Changes. Waters from half of the monitoring wells in this area have shown little or no change in character or mineral content. Analyses for the remaining wells showed fluctuations, with little evidence of a definite trend.

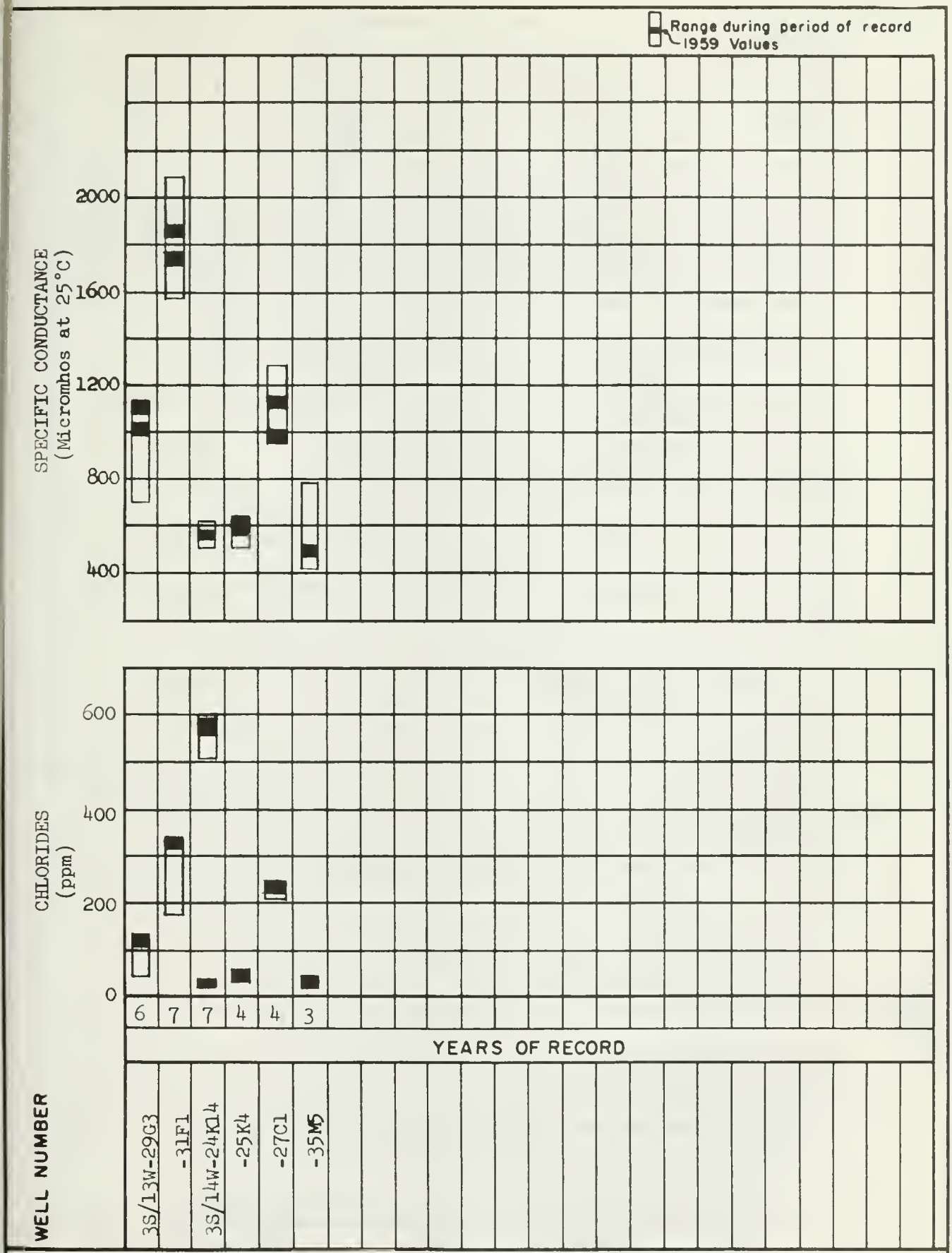
WATER QUALITY RANGES

WEST COAST BASIN - SANTA MONICA BAY AREA



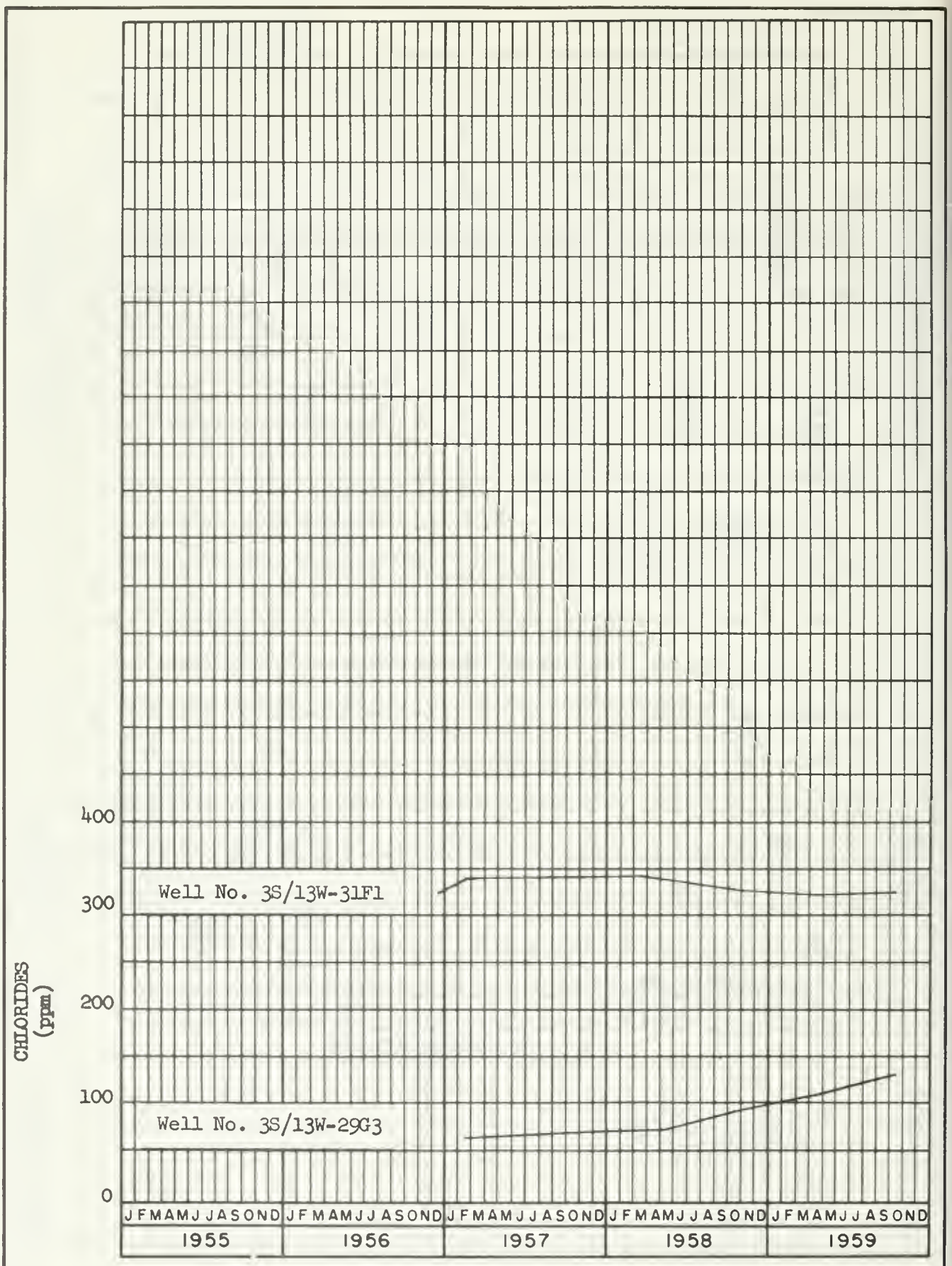
WATER QUALITY RANGES

WEST COAST BASIN - HAWTHORNE - GARDENA AREA



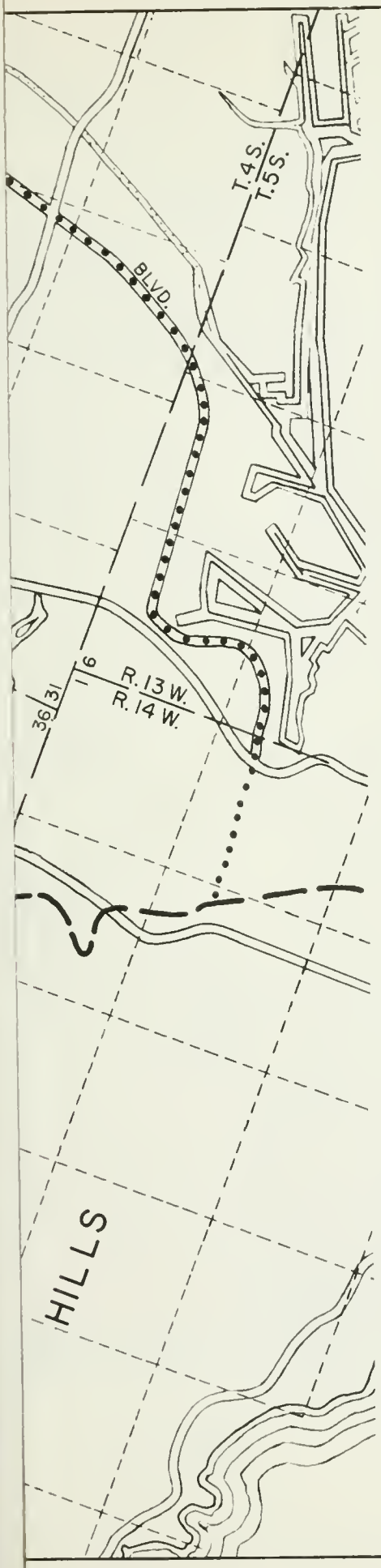
WATER QUALITY RANGES

WEST COAST BASIN - TORRANCE AREA



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

WEST COAST BASIN - TORRANCE AREA



LEGEND

BASIN BOUNDARY

APPROXIMATE LIMITS OF MONITORED AREA

7K2 MONITORED WELL

FAULT LINES

AREA OF CHLORIDE CONCENTRATION GREATER THAN 500 PPM SPRING 1959

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA

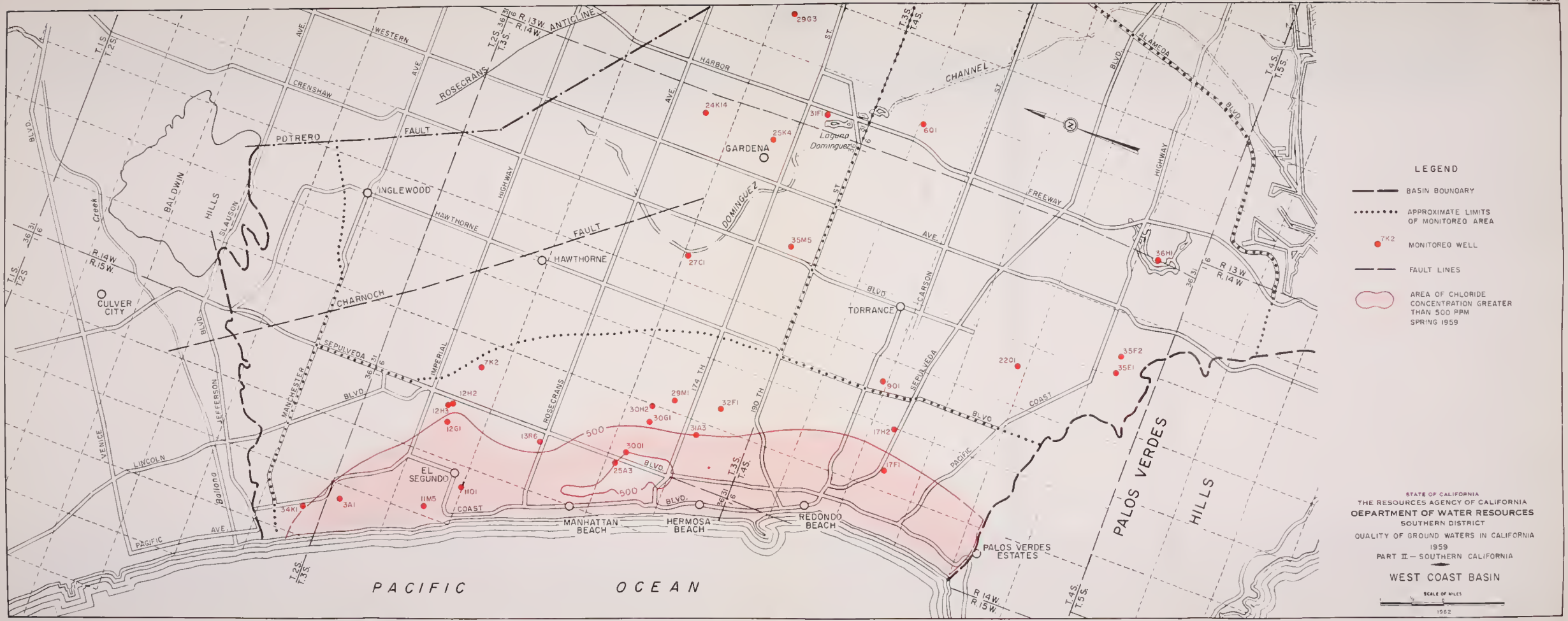
1959

PART II — SOUTHERN CALIFORNIA

WEST COAST BASIN

SCALE OF MILES
½ 0 1

1962


LEGEND
BASIN BOUNDARY
APPROXIMATE LIMITS OF MONITORED AREA
7K2 MONITORED WELL
FAULT LINES
AREA OF CHLORIDE CONCENTRATION GREATER THAN 500 PPM SPRING 1959
STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT
QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II — SOUTHERN CALIFORNIA
WEST COAST BASIN
SCALE OF MILES
1962
PACIFIC OCEAN
PALOS VERDES HILLS
GARDENA
INGLEWOOD
HAWTHORNE
TORRANCE
CULVER CITY
EL SEGUNDO
MANHATTAN BEACH
HERMOSA BEACH
REDONDO BEACH
PALOS VERDES ESTATES
Laguna Dominguez
POTRERO FAULT
CHARNOCH FAULT
DOMINGUEZ FAULT
ROSECRANS ANTICLINE
500
29G3
24K14
31F1
25K4
60I
35M5
27C1
36H1
7K2
12H2
12H3
12G1
13R6
30H2
30G1
29M1
32F1
31A3
30O1
25A3
22O1
35F2
35E1
90I
17H2
17F1
34K1
3A1
11M5
11O1

Central Basin Pressure Area and Los Angeles Forebay Area (4-11.03) and (4-11.04)

The Central Basin is located in the south central portion of Los Angeles County. It is bounded by the Hollywood Basin on the north, the West Coast Basin on the west, the Anaheim Basin of Orange County on the south, and a series of low hills on the east. The Central Basin is subdivided into four areas: the Los Angeles Forebay Area, the Montebello Forebay Area, the Whittier Area, and the Central Basin Pressure Area. Of these four areas, the ground water monitoring program is conducted in portions of the Central Basin Pressure Area (4-11.03) and the Los Angeles Forebay Area (4-11.04) only.

Except for the portion of the basin abutting the hills on the northeast, the predominant topography of the two areas monitored is that of a flat, gently sloping plain, extending approximately 25 miles from the Los Angeles-Orange County line northwesterly to the vicinity of the Santa Monica Mountains. It has an average width of 12 miles and encompasses an area of about 220 square miles; boundaries are shown on Plate 6.

Ground Water Occurrence. The principal sources of ground water are the Recent and Pleistocene sediments. Ground water in the Los Angeles Forebay Area is unconfined. Clay strata overlying the aquifers in the Central Basin Pressure Area confine ground waters under hydrostatic pressure. Wells yield up to 5,000 gallons per minute but average about 500 gallons per minute.

Ground Water Development and Use. Ground water is extensively developed to supply municipal and industrial requirements. There is little irrigated agriculture remaining in the Central Basin.

Major Waste Discharges. Industrial waste waters and domestic sewage constitute the major waste discharges. These wastes are discharged to the

Central Basin Pressure Area and Los Angeles Forebay Area (4-11.03) and (4-11.04)

The Central Basin is located in the south central portion of Los Angeles County. It is bounded by the Hollywood Basin on the north, the West Coast Basin on the west, the Anaheim Basin of Orange County on the south, and a series of low hills on the east. The Central Basin is subdivided into four areas: the Los Angeles Forebay Area, the Montebello Forebay Area, the Whittier Area, and the Central Basin Pressure Area. Of these four areas, the ground water monitoring program is conducted in portions of the Central Basin Pressure Area (4-11.03) and the Los Angeles Forebay Area (4-11.04) only.

Except for the portion of the basin abutting the hills on the northeast, the predominant topography of the two areas monitored is that of a flat, gently sloping plain, extending approximately 25 miles from the Los Angeles-Orange County line northwesterly to the vicinity of the Santa Monica Mountains. It has an average width of 12 miles and encompasses an area of about 220 square miles; boundaries are shown on Plate 6.

Ground Water Occurrence. The principal sources of ground water are the Recent and Pleistocene sediments. Ground water in the Los Angeles Forebay Area is unconfined. Clay strata overlying the aquifers in the Central Basin Pressure Area confine ground waters under hydrostatic pressure. Wells yield up to 5,000 gallons per minute but average about 500 gallons per minute.

Ground Water Development and Use. Ground water is extensively developed to supply municipal and industrial requirements. There is little irrigated agriculture remaining in the Central Basin.

Major Waste Discharges. Industrial waste waters and domestic sewage constitute the major waste discharges. These wastes are discharged to the

ocean by sewers after treatment at a local sewage treatment plant. Disposal of brine wastes to injection wells from a few small oil fields in the area present a minor threat of ground water pollution.

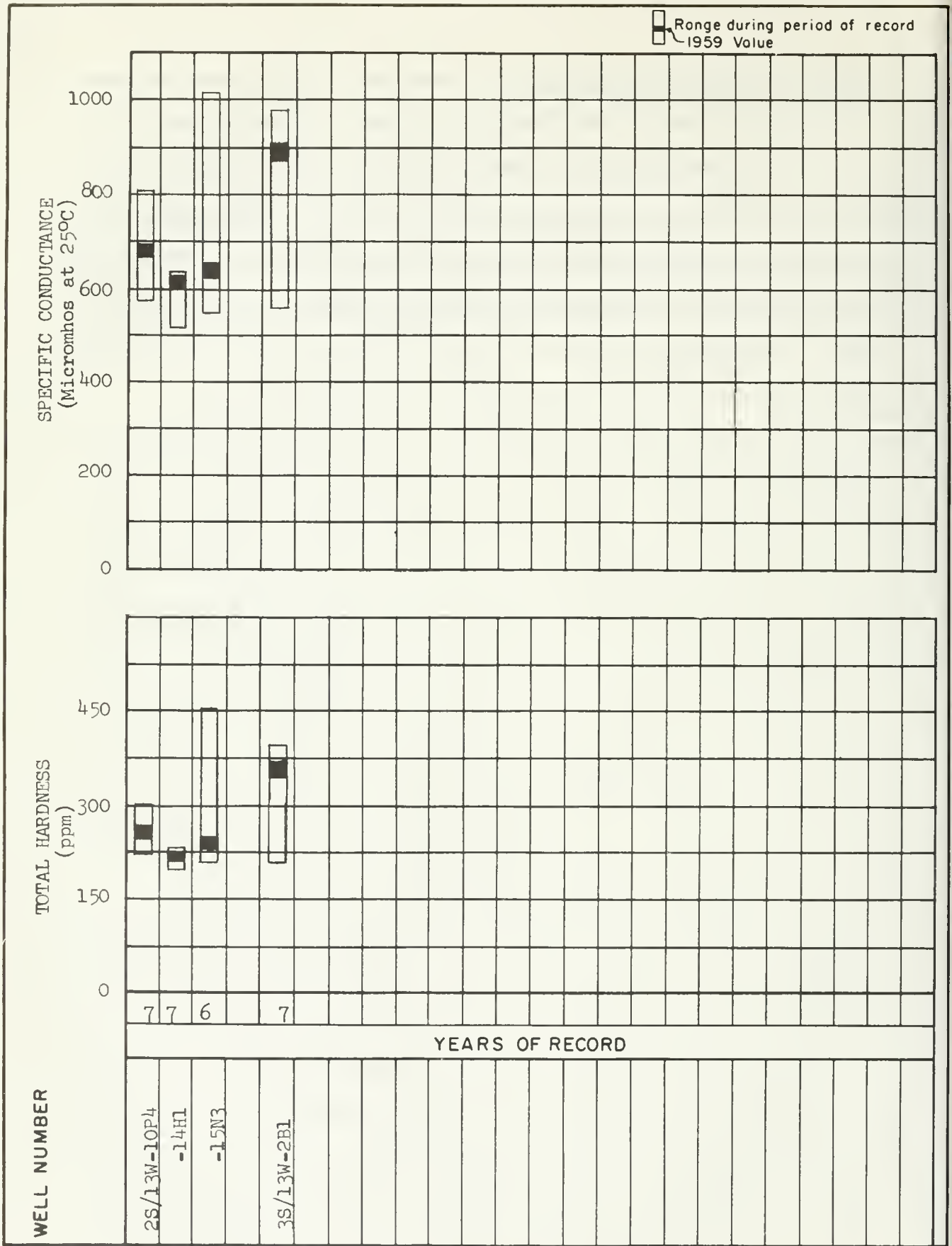
Monitoring Program. The ground water monitoring program is concerned with an area of about 30 square miles, southwest of the industrial complex centered in the City of Vernon, and overlying portions of both the Los Angeles Forebay Area and Central Basin Pressure Area.

An investigation of industrial waste pollution of ground water in this area was conducted by the Los Angeles Water Pollution Control Board in 1950. Water from thirty-three wells was found to exhibit hydrocarbon tastes and odors, increased mineralization, or both. Although the findings in the investigation were not conclusive, the data indicated that the source of pollution was industrial wastes discharged to the ground surface which gravitated to the water-bearing zones directly, or possibly through defective or nonused wells. Monitoring was instituted to observe the duration of the pollution in ground waters near the ground surface, and to detect and follow quality changes that might occur in deeper aquifers as a result of downward migration of the affected waters.

During 1959, six samples were collected from two monitored wells.

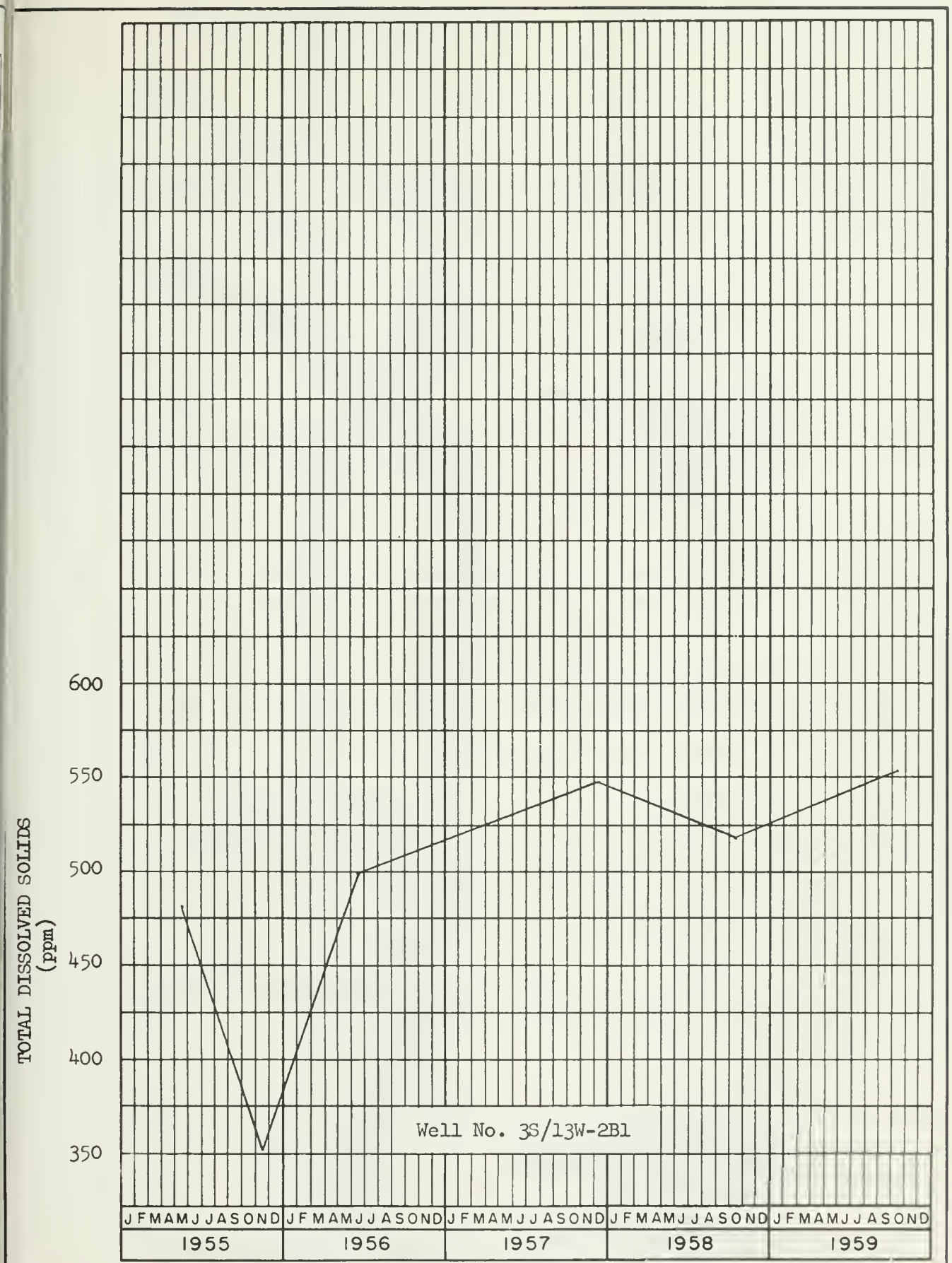
Evaluation of Water Quality. Mineral analyses of ground water samples obtained over the past six years show that the character of ground water ranged from calcium bicarbonate to calcium bicarbonate-sulfate. Analyses of samples collected from monitoring wells in 1959 showed that total dissolved solids (estimated from electrical conductivity data) ranged from about 460 to 600 ppm, hardness from 224 to 356 ppm and chlorides from 29 to 73 ppm. Although hydrocarbon tastes and odors have been noted at times, the water is generally suitable for prevailing beneficial uses.

Significant Water Quality Changes. Comparison of the mineral analyses for 1959 with those of the preceding five years of record showed a slowly continuing increase in mineral content of ground water, but no marked increase in any individual constituent. Well 3S/13W-2B1, a municipal well located in the southwestern part of the City of South Gate, continued to show the greatest increase in mineral concentration for wells in the monitored area.



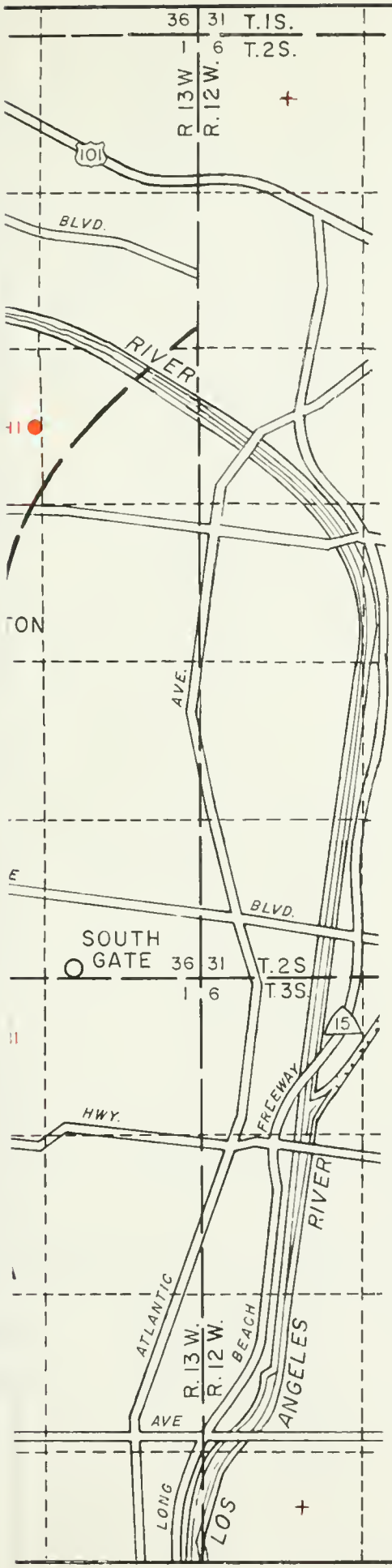
WATER QUALITY RANGES

LOS ANGELES FOREBAY AREA AND
CENTRAL BASIN PRESSURE AREA



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

CENTRAL BASIN PRESSURE AREA AND LOS ANGELES FOREBAY AREA



LEGEND

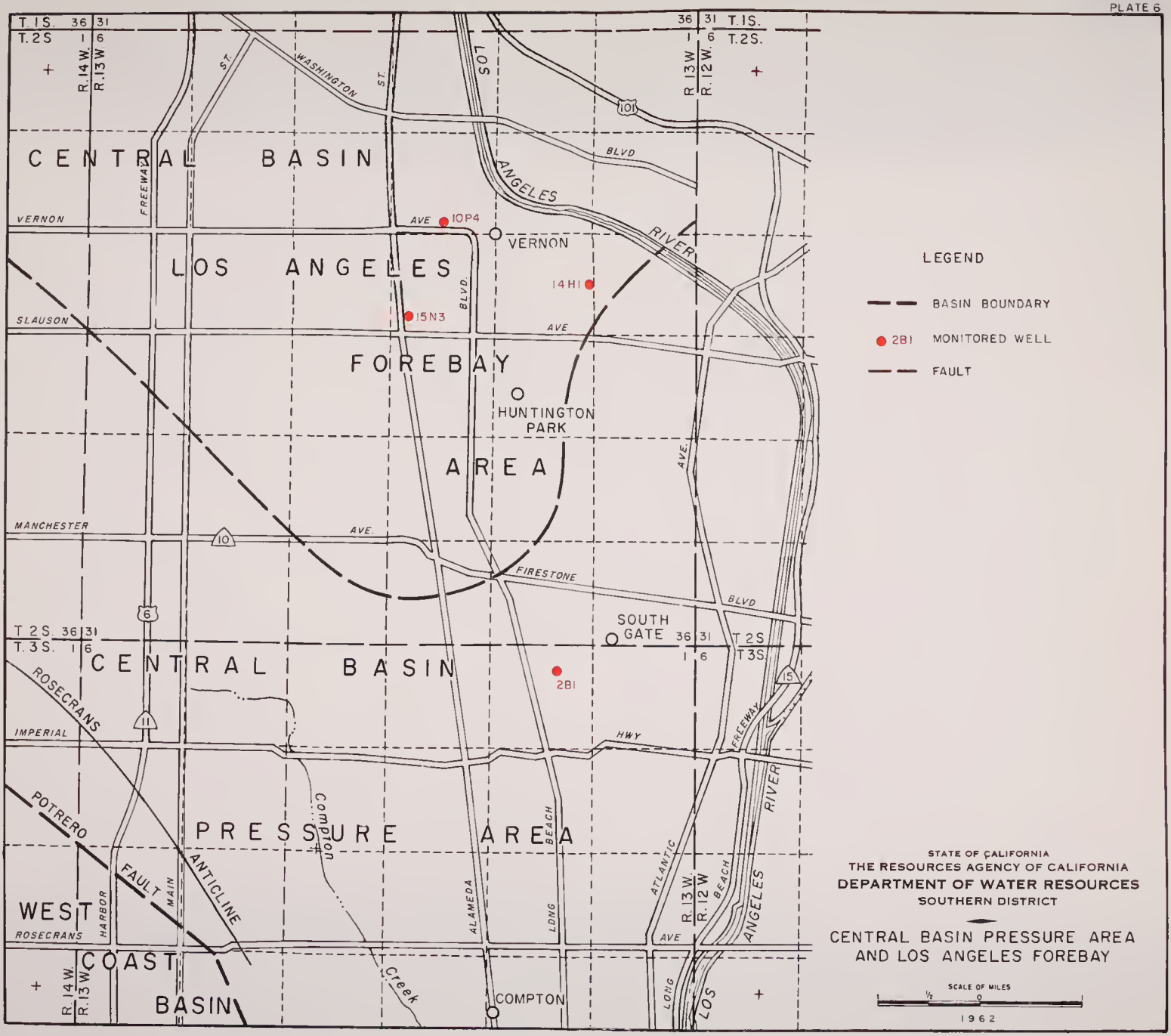
- BASIN BOUNDARY
- 281 MONITORED WELL
- FAULT

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

CENTRAL BASIN PRESSURE AREA AND LOS ANGELES FOREBAY

SCALE OF MILES
1 ½ 0 1

1962


T.1S. 36 31
T.2S 1 6
R.14 W. R.13 W
R.13 W R.12 W
CENTRAL BASIN
LOS ANGELES
FOREBAY
AREA
CENTRAL BASIN
PRESSURE AREA
WEST COAST BASIN
VERNON
SLAUSON
MANCHESTER
ROSECRANS
IMPERIAL
POTRERO FAULT
ANTICLINE
WASHINGTON ST.
FREEWAY
AVE
BLVD
ANGELES RIVER
VERNON
HUNTINGTON PARK
SOUTH GATE
COMPTON
Compton Creek
ALAMEDA
LONG BEACH
ATLANTIC
HWY
10P4
14H1
15N3
2B1
101
10
6
1
15
LEGEND
BASIN BOUNDARY
2B1 MONITORED WELL
FAULT
STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT
CENTRAL BASIN PRESSURE AREA
AND LOS ANGELES FOREBAY
SCALE OF MILES
1962

Main San Gabriel Basin (4-13.01)

The Main San Gabriel Basin is an interior valley in the east central portion of Los Angeles County. The basin occupies the valley between the San Gabriel Mountains on the north, the San Jose and the Puente Hills on the east and southeast, and the Merced Hills in the south and west. The valley floor slopes gently to the southwest. The basin averages about nine miles in width and encompasses an area of approximately 115 square miles; boundaries are shown on Plate 7, "Main San Gabriel Basin."

Ground Water Occurrence. The principal source of ground water is alluvium deposited from Pleistocene to Recent times. In general, the aquifer is a thick section of unconsolidated sediments and the ground water is unconfined. Wells yield up to 5,500 gallons per minute and average about 1,000 gallons per minute.

Major Waste Discharges. The major waste discharges are industrial and sewage wastes, and domestic rubbish and garbage. Most of the domestic and industrial sewage wastes are collected by the sewerage system of the County Sanitation Districts of Los Angeles County and discharged to the ocean. Disposal of rubbish and garbage in a number of abandoned gravel pits excavated in the highly permeable alluvium of the basin is widely practiced. Past disposal practices have posed the threat of ground water pollution if the decomposable refuse should be saturated by high ground water levels or percolation of applied water as rainfall. Continual efforts are being made by this department to urge restriction of disposal of decomposable refuse in these pits to elevations above expected future high ground water levels.

Monitoring Program. The monitoring program was instituted in 1953 to investigate the influence on ground water quality of a rapid change from

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Monitoring Program. The monitoring program was instituted in 1953 to investigate the influence on ground water quality of a rapid change from

agricultural use of land to urban and suburban development. A lag in providing waste disposal facilities for the rapidly growing population presented a threat to ground water quality. It now appears that one of the greatest hazards is the potential pollution of ground water by the disposal of decomposable refuse in the alluvium of the basin.

In 1959, 15 samples were collected from seven monitoring wells in the Main San Gabriel Basin.

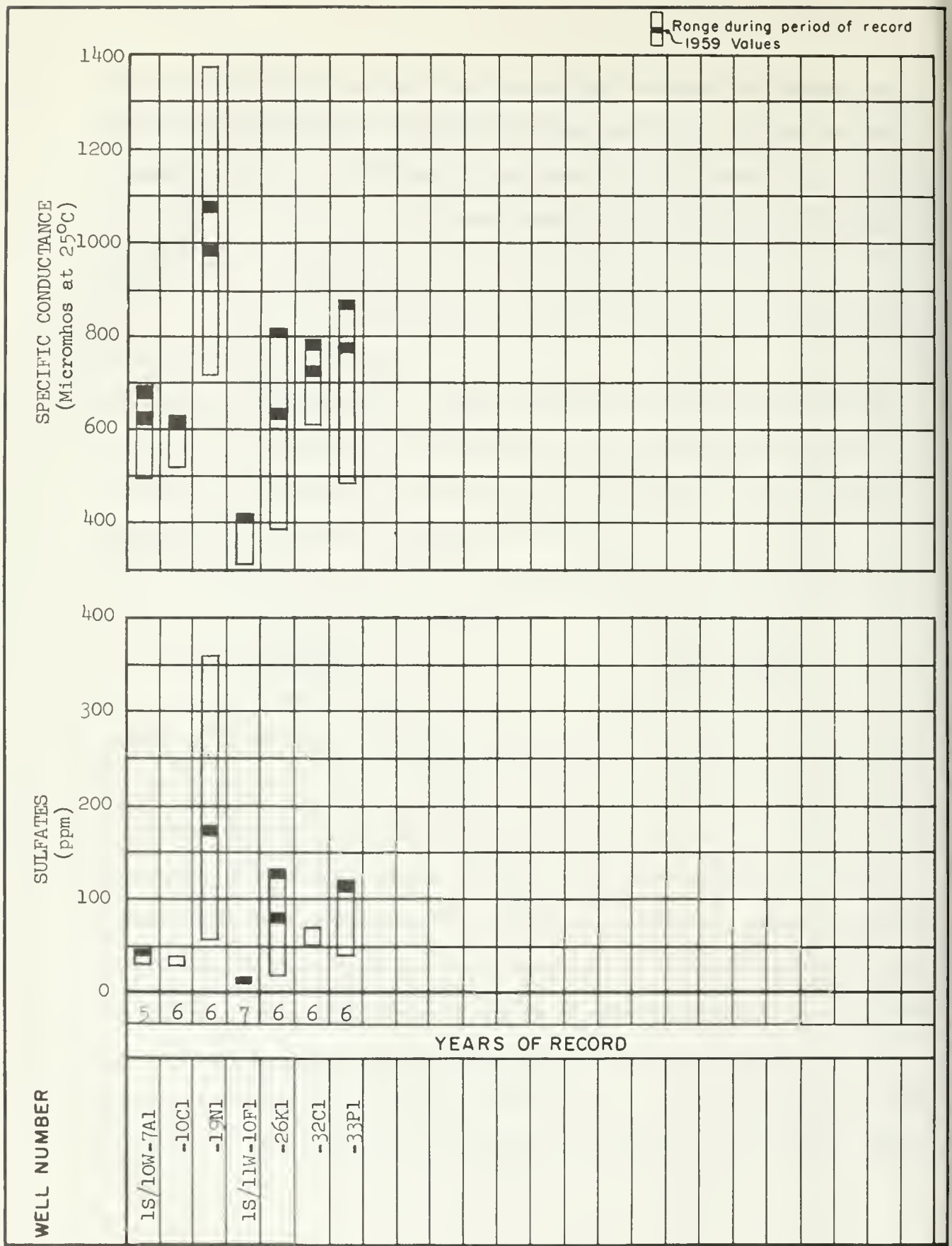
Evaluation of Water Quality. Mineral analyses of ground water samples show that the character of the ground water is predominantly calcium bicarbonate. Although the waters are hard to very hard, they are generally suitable for prevailing beneficial uses.

In 1959, the ranges for significant mineral constituents were:

Total dissolved solids	437 to 679 ppm
Chlorides	9 to 84 ppm
Nitrates	10 to 79 ppm
Total hardness	165 to 416 ppm

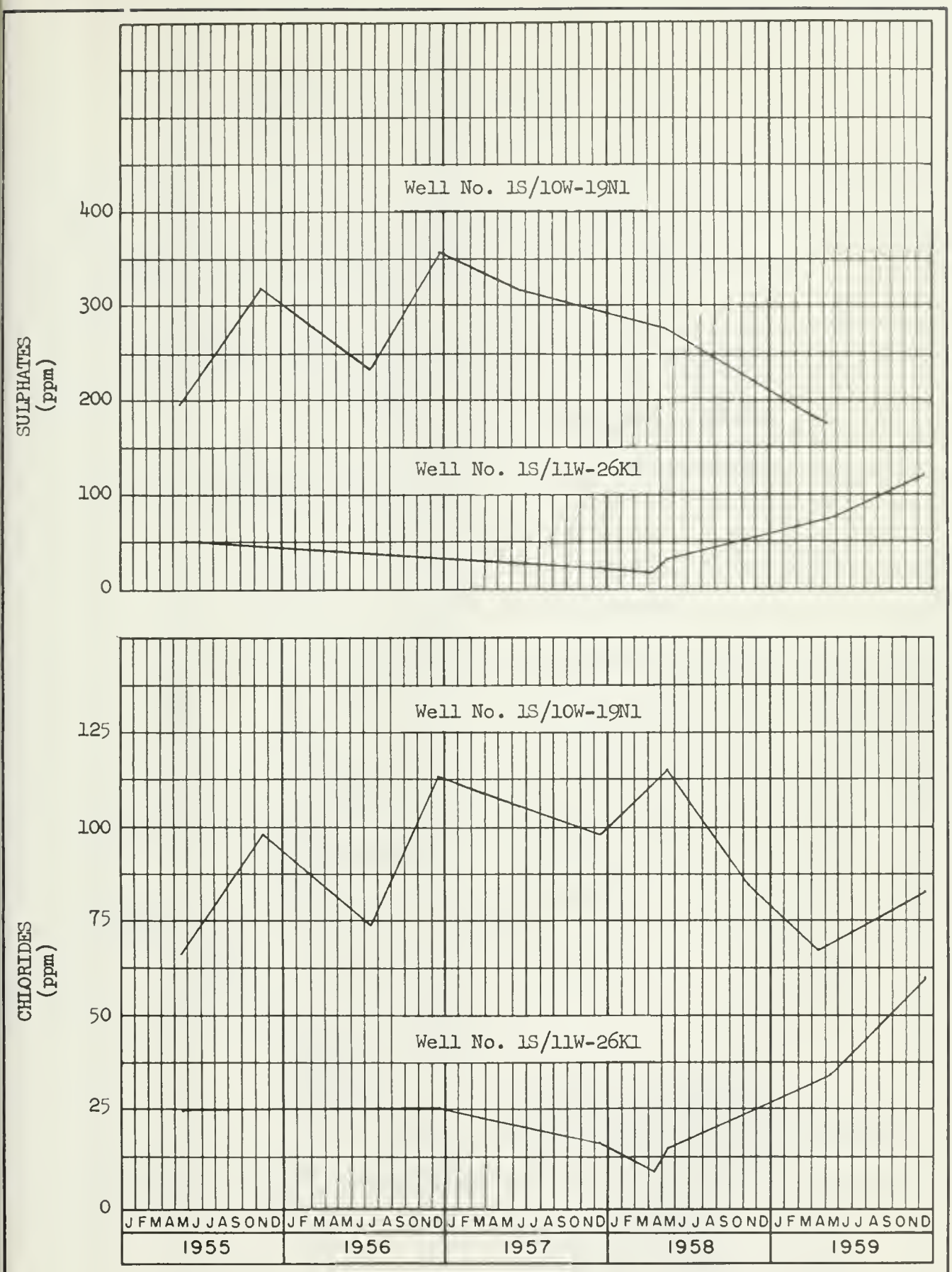
Significant Water Quality Changes. Comparison of analyses of ground water samples obtained in 1959 with those of the preceding six years shows that only minor variations in mineral quality have occurred in the seven years of record. A continuing slight increase in mineral content was noted in ground water throughout the basin, with the exception of samples from well 1S/11W-26K1, located about two miles southeast of El Monte and west of the San Gabriel River. The greater increase in mineral content and in sulfates for this well is attributed to ground water recharge resulting from past releases of Colorado River water to Walnut Creek. Well 1S/10W-19N1 showed a gradual return toward native character and quality after showing effects

from seepage of Colorado River water which was last conveyed in a canal near the well in 1957. Analysis of a sample collected from this well in May 1959, showed a nitrate content of 79 ppm, which exceeds the recommended limit of 44 ppm for drinking water.

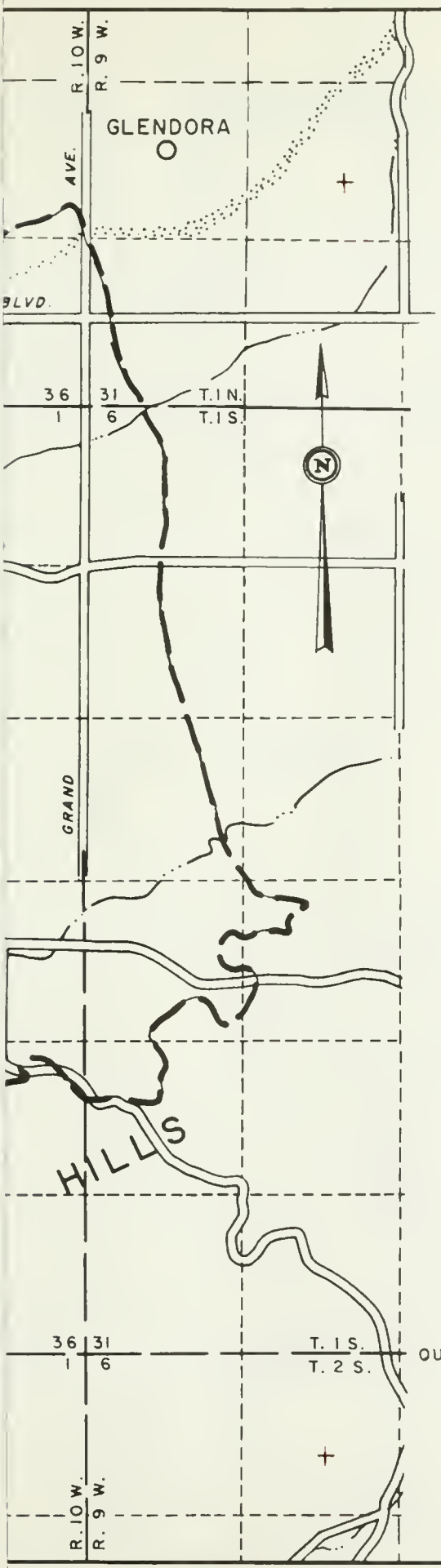


WATER QUALITY RANGES

MAIN SAN GABRIEL BASIN



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS
MAIN SAN GABRIEL BASIN



LEGEND

BASIN BOUNDARY

MONITORED WELL

7A1

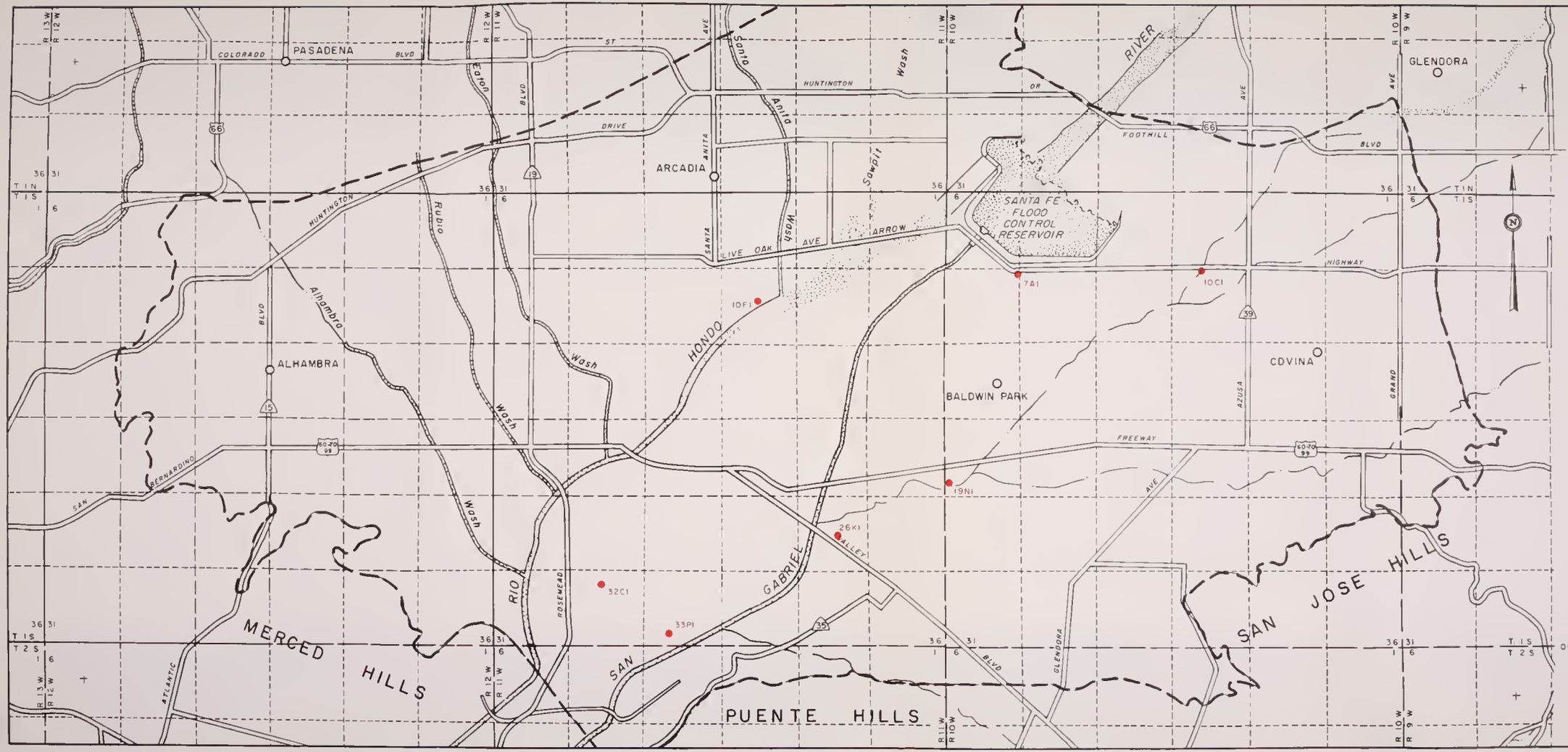
STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II SOUTHERN CALIFORNIA

MAIN SAN GABRIEL BASIN

SCALE OF MILES
½ 0 1

1962


PASADENA
ARCADIA
ALHAMBRA
BALDWIN PARK
COVINA
GLENDORA
SANTA FE FLOOD CONTROL RESERVOIR
MERCED HILLS
PUENTE HILLS
SAN JOSE HILLS
RIO HONDO
SAN GABRIEL RIVER
Alhambra Wash
Rubio Wash
Sawpit Wash
Santa Anita Wash
HUNTINGTON DRIVE
COLORADO BLVD
FOOTHILL BLVD
ARROW HIGHWAY
LIVE OAK AVE
SAN BERNARDINO FREEWAY
ATLANTIC BLVD
ROSEMEAD BLVD
GLENDORA BLVD
AZUSA AVE
GRAND AVE
10F1
7A1
10C1
19N1
26K1
32C1
33P1
LEGEND
BASIN BOUNDARY
MONITORED WELL
STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT
QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II SOUTHERN CALIFORNIA
MAIN SAN GABRIEL BASIN
SCALE OF MILES
1962

Lahontan Region (No. 6)

The Lahontan Region is a part of the Great Basin of the United States. It comprises all drainage basins in California east of the Central Valley and South Coastal areas, except those basins in the southwestern part of the State which drain to the Salton Sea or the Colorado River.

The region extends about 500 miles along the eastern boundary of the State from the Oregon state line on the north to the San Bernardino Mountains on the south. It is bounded on the west by the Warner Mountains, Sierra Nevada Range, Tehachapi, Sierra Pelona, San Gabriel, and San Bernardino Mountains, and on the east by the California-Nevada boundary. The southern boundary is the southerly drainage divide of the Mojave River. The region varies in width from about 10 miles at the Oregon boundary to about 250 miles on the south, and has an area of approximately 33,000 square miles. It encompasses all of Mono and Inyo Counties and parts of Modoc, Lassen, Sierra, Placer, El Dorado, Alpine, Kern, Los Angeles, and San Bernardino Counties.

All basins in this region drain interiorly. Several very large dry lakes are found in basin depressions in the southern desert portion. Twelve hydrographic provinces comprise the main watershed areas, and 60 ground water basins have been identified in the region.

Little development of remote interior basins has occurred, and in these, available data indicate that ground water quality ranges from excellent to unsuitable for beneficial uses. Extensive development has taken place in the southernmost part of the region, principally in two areas; Antelope Valley in Los Angeles and Kern Counties, and Mojave River

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Valley in San Bernardino County. In these areas the ground water quality also ranges from excellent to unsuitable for beneficial uses.

Precipitation varies from sparse to abundant in various parts of the region due to extreme differences in latitude and elevation. The highest and lowest elevations in the region are 14,495 feet above sea level at Mount Whitney and 282 feet below sea level in Death Valley. Precipitation in the major areas of ground water use is scanty, ranging from an annual average of 40 inches on the mountain ridges to less than five inches in the valley areas. Usually precipitation occurs in the winter season, but summer storms of cloudburst proportions occasionally arise.

Use of water is rapidly shifting in emphasis from irrigation to municipal and industrial uses. In Antelope Valley, military bases and aircraft and missile production form a substantial part of the economy. However, considerable areas of irrigated agriculture are still found there as well as in Fremont Valley and along the Mojave River. Ground water provides most of the water used in the southern portion of the Lahontan Region and where it is extensively developed, the ground water levels are falling.

Analyses of ground water showed that no significant quality changes have occurred in Antelope Valley Basin, although water levels continued to drop. Dissolved minerals showed a slight increase over the preceding year in ground waters of Lower Mojave River Valley Basin, and taste, odor, and foaming problems were widespread. It is because of these significant water quality problems that the ground water monitoring program for the Lahontan Region is concentrated in the Lower Mojave River Valley between Barstow and Yermo. In this area, 13 wells are sampled three times a year, in March, May, and September.

Lower Mojave River Valley (6-40), Barstow to Yermo

Lower Mojave River Valley extends from the river narrows near Barstow 25 miles eastward along the river channel. The basin is bounded on the north by hills that rise abruptly along the southern extent of the Waterman Thrust fault. The southern boundary is a ridge with a maximum elevation of 3,120 feet composed of a thick deposit of Pleistocene alluvium. The eastern limit of the basin is formed by a complex of interbedded volcanic and sedimentary rocks that rise abruptly from the river's flood plain along an erosional escarpment. The basin varies in width from two to seven miles, and encompasses about 160 square miles; boundaries are shown on Plate 8.

Ground Water Occurrence. The upper portion of the Lower Mojave River ground water basin is a narrow and shallow deposit of river alluvium adjacent to and overlying nonwater-bearing rocks. The base of the Recent alluvium is about 200 feet below the ground surface. A few wells are deeper and produce some water from the underlying and adjacent Older alluvium. The aquifers are unconfined. Ground water near the river is generally found within 20 feet from the surface, and seasonal variations are usually less than 20 feet.

Ground Water Development and Use. Ground water currently supplies all prevailing beneficial uses. Ground water is used for domestic and municipal, industrial, and irrigation purposes. Military bases and railroad repair shops are large industrial users.

Major Waste Discharges. Major waste discharges are domestic sewage of the City of Barstow and the military establishments, and industrial wastes from the railroad repair shops. The sewage effluent from the Barstow sewage treatment plant is used for irrigation, and overflow is discharged to the Mojave River channel. Industrial waste water from the railroad shops and yards is partially treated in settling and skimming ponds, and the effluent is discharged to the river channel.

Significant quantities of synthetic detergents, petroleum products, phenols, cyanide, hexavalent chromium, and relatively high fluoride and boron concentrations have been identified in these waste waters at various times.

Monitoring Program. The monitoring program was instituted in 1954 following the recommendation by the Lahontan Regional Water Pollution Control Board. Complaints of tastes and odors in well waters in the vicinity of Barstow prompted an investigation conducted by the State Division of Water Resources in 1951 and 1952, at the request of the board. Although no evidence of pollution was found in the investigation, the monitoring program was established to detect possible pollution of ground water supplies by sewage and industrial waste discharges into the Mojave River channel, or degradation by inflow of poor quality ground water from the Older alluvium of the foothills on the south.

In 1958 and 1959, sampling was intensified to obtain additional data for a joint report of the board and the Department of Water Resources. The State Department of Public Health conducted studies of taste and odor problems in the investigation, and the Bureau of Sanitary Engineering made sanitary surveys in the area. The expanded monitoring program resulted in the collection of 43 samples from 13 wells in 1959.

Evaluation of Water Quality. The ground waters in the Recent alluvium of the river channel are sodium-calcium bicarbonate in character and are generally of good quality for prevailing beneficial uses, but fluoride is sometimes high in an area south of the river and east of Barstow.

Water in the Older alluvium is predominantly sodium sulfate in type. The water often exceeds recommended limits for drinking water in

total dissolved solids, sulfate, fluoride, and occasionally, chloride. It varies from hard to very hard water. It is usually class 2 and sometimes class 3 irrigation water, and is very often high in boron content.

Analyses of ground water samples obtained in 1959 showed the following ranges for significant mineral constituents:

Total dissolved solids	259 to 1,285 ppm
Chlorides	28 to 261 ppm
Sulfates	31 to 423 ppm
Boron	0.08 to 3.60 ppm
Fluorides	0.3 to 3.5 ppm

Significant Water Quality Changes. Comparison of analyses of the ground water samples obtained in 1959 with those of the previous five years shows that in general only minor irregular changes in mineral quality have occurred. These changes appear to be influenced by magnitude of flow in the Mojave River. Mineral quality in general was similar to that of 1957 after showing a slight improvement in 1958. The 1958-59 rainfall season was a period of deficiency following the higher than normal precipitation in the 1957-58 season.

Areas where taste, odor, and foaming problems occurred extended for about two and one-half miles down the river from points of major waste discharges. The areas affected by these quality problems are shown on Plate 8.

Well 9N/2W-1F1 west of Barstow Narrows is monitored to follow quality changes of subsurface inflow to the basin. This well produces waters originating in both the river alluvium and the side slopes, reflecting quality changes associated with quantity of inflow.

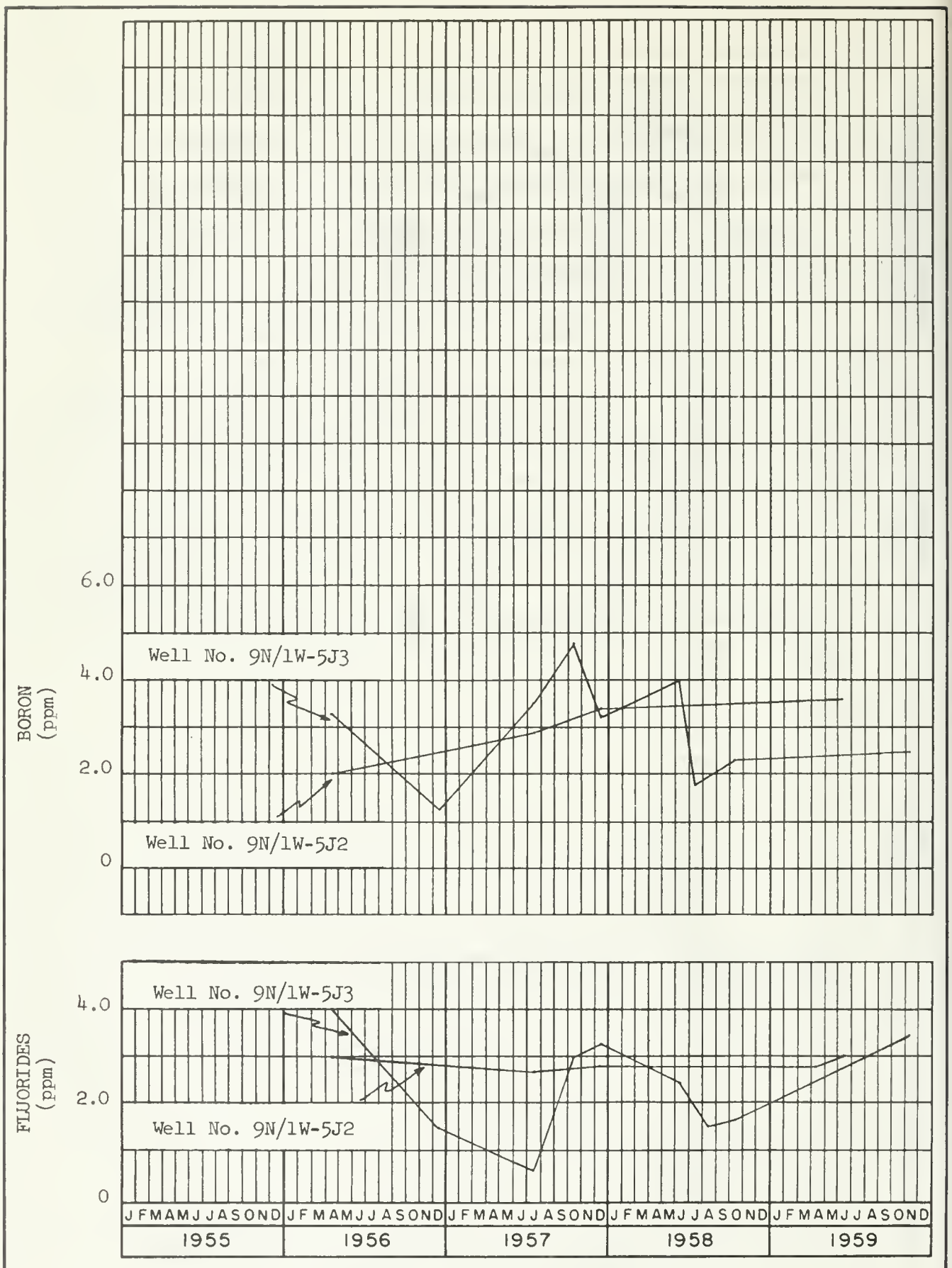
Wells 9N/1W-5J2 and -5J3, located east of Barstow and south of the river channel, showed prominent effects of waste discharges on ground

water quality. These wells continue the record of well 9N/1W-5J1 shown in earlier reports of this series. The data show a shift in character from sodium sulfate-bicarbonate to sodium sulfate-chloride, increases in total dissolved solids, sulfates, and chlorides, and high fluoride and boron content. Oily tastes and odors, and foaming have been noted in the ground water from these wells at various times.

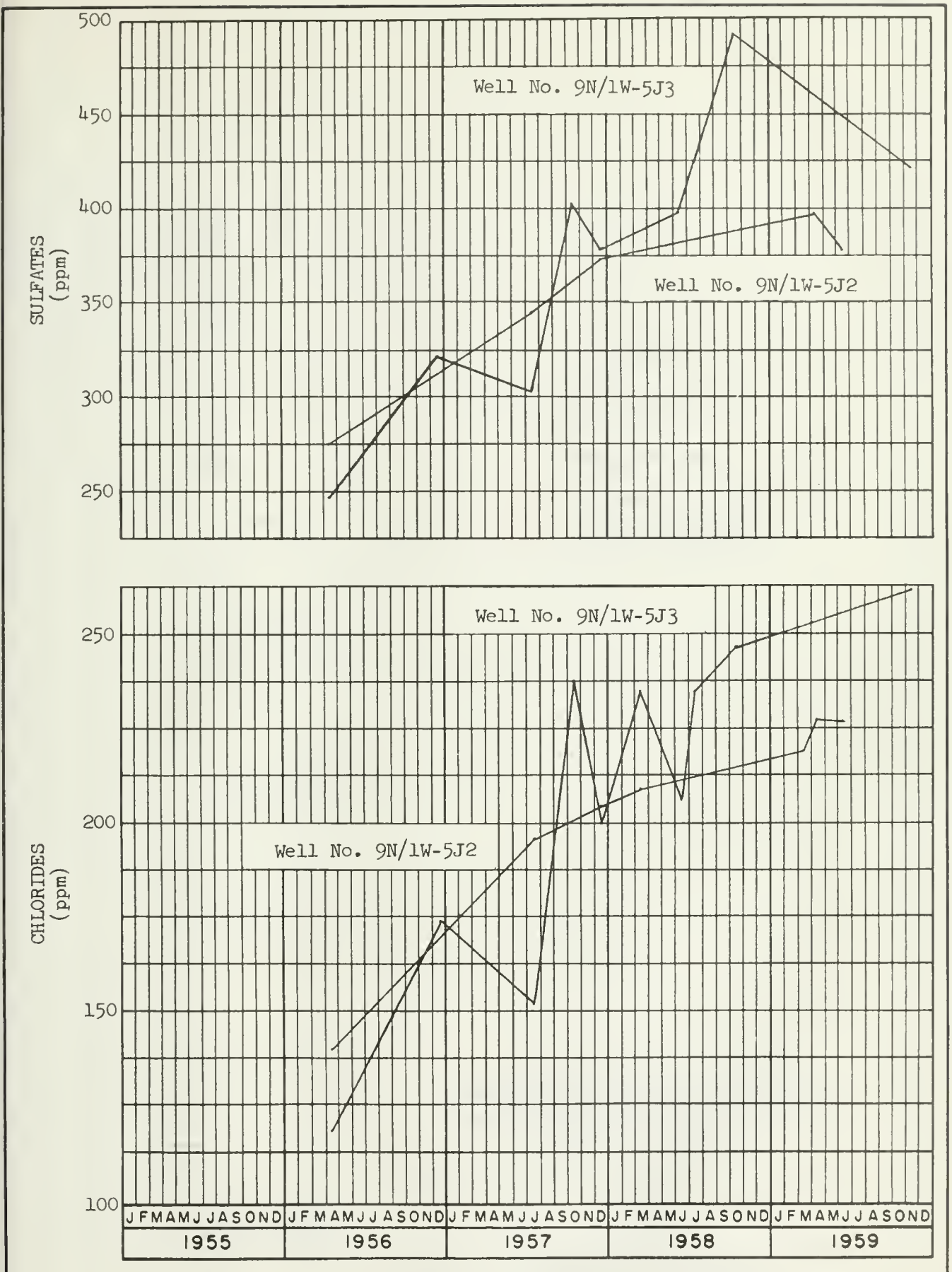
Well 9N/1W-10D2, formerly reported as 9N/1W-10D1, located two miles east of Barstow and south of the river channel, shows variations in quality following changes in recharge conditions, and ground water use and reuse in the basin. Water in this well, which in 1958 exhibited hydrocarbon tastes and odors, showed no effects in 1959 attributable to waste discharges.

WATER QUALITY RANGES

LOWER MOJAVE RIVER VALLEY
BARSTOW TO YERMO



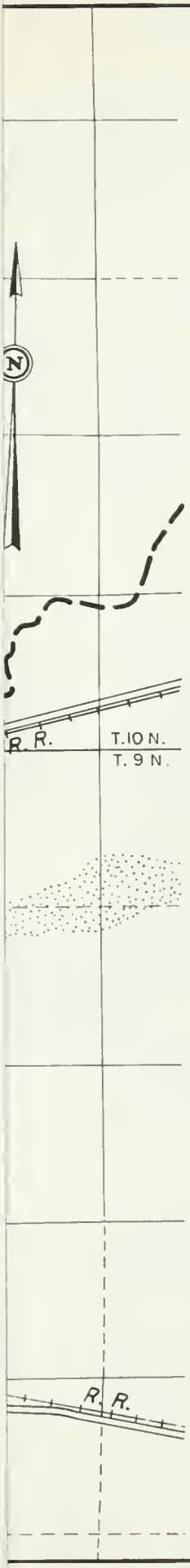
FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS
LOWER MOJAVE RIVER VALLEY
BARSTOW TO YERMO



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

LOWER MOJAVE RIVER VALLEY

BARSTOW TO YERMO



LEGEND

BASIN BOUNDARY

MONITORED WELL
10G1

AREA WHERE GROUND WATER IS AFFECTED BY TASTES AND ODORS

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

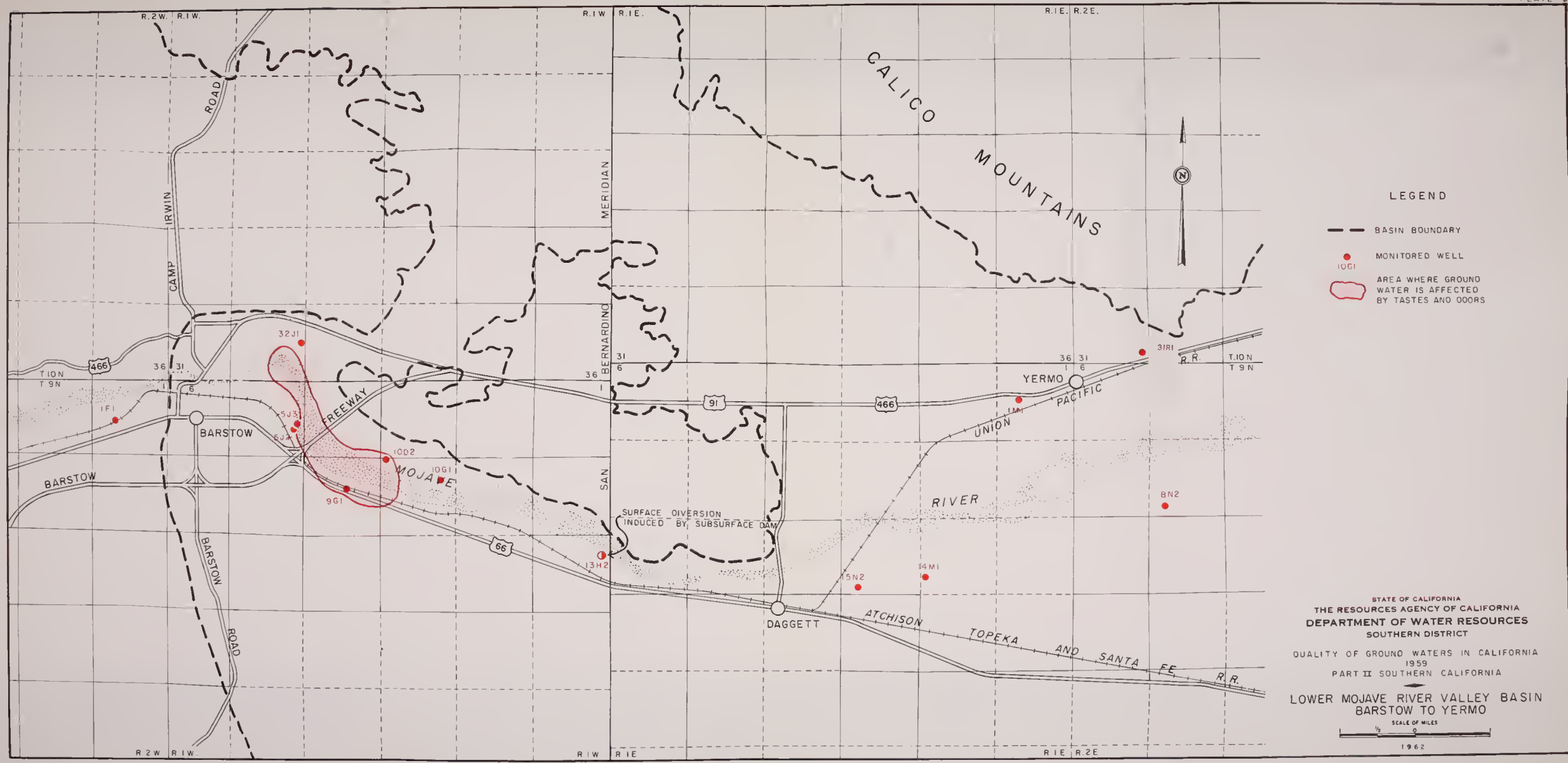
QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II SOUTHERN CALIFORNIA

LOWER MOJAVE RIVER VALLEY BASIN
BARSTOW TO YERMO

SCALE OF MILES
½ 0

1962

PLATE B



LEGEND

- BASIN BOUNDARY
- MONITORED WELL (10G1)
- AREA WHERE GROUND WATER IS AFFECTED BY TASTES AND ODORS

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II SOUTHERN CALIFORNIA

LOWER MOJAVE RIVER VALLEY BASIN BARSTOW TO YERMO

SCALE OF MILES
½ 0

1962

Colorado River Basin Region (No. 7)

The Colorado River Basin Region is part of the California desert area. It is bounded on the north by a series of mountain ridges which separate it from the Mojave River watershed area, on the east by the California-Nevada state line and the Colorado River, on the south by the United States-Mexico International Boundary, and on the west by the Peninsular and San Jacinto Ranges and the San Bernardino Mountains.

The region encompasses all of Imperial County, and parts of San Bernardino, Riverside, and San Diego Counties. The region's average width is about 125 miles, its average length is about 150 miles, and it encompasses an area of about 19,370 square miles.

Topography of the region is characterized by a number of broad valleys containing isolated mountains and separated by mountain ranges. Most of the region drains to the Colorado River or to the Salton Sea. However, there are many other basins that have interior drainage and contain dry lakes at their lowest elevations. Some of these dry lakes are several square miles in extent. In all, 46 ground water basins have been defined in this region.

Precipitation is meager in this region. The average annual rainfall varies from about 40 inches on mountain ridges to the west to about four inches in the valleys. Much of the rainfall occurs in the winter season, but summer storms of cloudburst proportions are frequent. Direct precipitation probably contributes very little to ground water replenishment. Recharge takes place predominantly by deep percolation of stream flow as it crosses the detrital cones at the mouths of canyons around the basins.

Colorado River Basin Region (No. 7)

The Colorado River Basin Region is part of the California desert area. It is bounded on the north by a series of mountain ridges which separate it from the Mojave River watershed area, on the east by the California-Nevada state line and the Colorado River, on the south by the United States-Mexico International Boundary, and on the west by the Peninsular and San Jacinto Ranges and the San Bernardino Mountains.

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Ground water is used primarily for irrigation in several basins. Colorado River water is imported for irrigation use in vast areas within the region, and where it is utilized, ground water is used primarily for domestic purposes. Some ground water is used for mining operations, for industrial uses, and for domestic uses in a number of desert resort communities.

Quality of ground water in the region varies from excellent to unsuitable for recognized beneficial uses.

Increasing ground water utilization exceeds replenishment in the major areas of ground water use. The consequent accelerated reduction of the supply occasions concern for the future. Protection of all usable ground waters from impairment by any source is made imperative by the vital importance of water in these desert areas.

The ground water monitoring program in the Colorado River Basin Region is at present limited to the southern portion of the Coachella Valley. In this area, 12 wells are sampled twice a year, in May and December.

Coachella Valley Basin (7-21) South Portion

The Coachella Valley is located in Riverside County in the northerly end of a great, elongated depression named the Salton Sink. It extends from the vicinity of Banning 75 miles southeasterly to the Salton Sea. The basin varies in width from an average of about 3 miles in the northwesterly portion to approximately 20 miles at Salton Sea, and has an area of about 680 square miles. The Salton Sea and a large part of the area monitored are below sea level. Basin boundaries are shown on Plate 9, "Coachella Valley South."

Ground Water Occurrence. The principal ground water producing sediments of Coachella Valley are unconsolidated alluvial debris consisting of gravel, sand, and silt. Fine-grained lake bed sediments cap the alluvium in the portion of the valley which lies between the City of Indio and the Salton Sea. In this area the major aquifers are confined. A shallow zone of perched water that overlies the principal aquifer contains predominantly an accumulation of irrigation return water and domestic waste water. The principal aquifer is replenished by ground water moving southeastward from the upper portion of the basin where ground water is unconfined. Water wells in the monitored area yield up to 2,000 gallons per minute.

Ground Water Development and Use. Extensive use of Colorado River water for irrigation since 1949 has limited the need for ground water for irrigation in the southern part of Coachella Valley. However, ground water is still used extensively for domestic and industrial purposes. Moderate to extensive development of ground water has occurred in the upper portion of the basin where ground water, supplemented by local surface water supplies, meets all current requirements.

Major Waste Discharges. Irrigation return water constitutes the major waste discharge in the area monitored. Minor discharges are sewage treatment plant effluents used locally for irrigation, or discharged to the channel of the Whitewater River. Sanitary landfill methods are used at several sites northwest of the City of Indio for disposal of garbage and domestic rubbish.

Monitoring Program. The ground water monitoring program in Coachella Valley was instituted in 1954 to detect any changes in ground water quality produced by imported water or possible impairment resulting from movement of degraded water from a shallow aquifer into a deeper aquifer through interconnections, aquifers, or through gravel packed or improperly constructed or destroyed wells.

Twenty-two samples were collected in 1959 from the 12 wells in the monitoring program.

Evaluation of Water Quality. Ground water in the upper portion of the valley is predominantly calcium bicarbonate in character, good to excellent in quality, and low in percent sodium. Sodium sulfate waters occur locally in the vicinity of Desert Hot Springs and Garnet, in the upper part of the valley; these waters are generally unsuitable for irrigation and usually exceed drinking water standards for sulfates, total dissolved solids, and fluoride which ranges to more than 9 ppm. Ground waters in the vicinity of Indian Wells and Indio contain relatively high concentrations of nitrates from an undetermined source believed to be of natural origin. At times the nitrate content exceeds the tentative limit of 44 ppm recommended for drinking water standards.

The ground water character shifts toward sodium bicarbonate or sulfate in the southerly portion of the basin, and percent sodium ranges to more than 90 in ground water from wells near Salton Sea. The high percent

sodium renders the water generally unsuitable for irrigation. Limited data indicate that water in the semiperched zone is highly mineralized due to the concentration of soluble minerals by irrigation use.

The analyses of ground water collected in 1959 show the following ranges for significant constituents:

Total dissolved solids	142 to 1,015 ppm
Chloride	7 to 328 ppm
Sulfate	17 to 333 ppm
Fluoride	0.2 to 6.4 ppm
Percent sodium	19 to 88

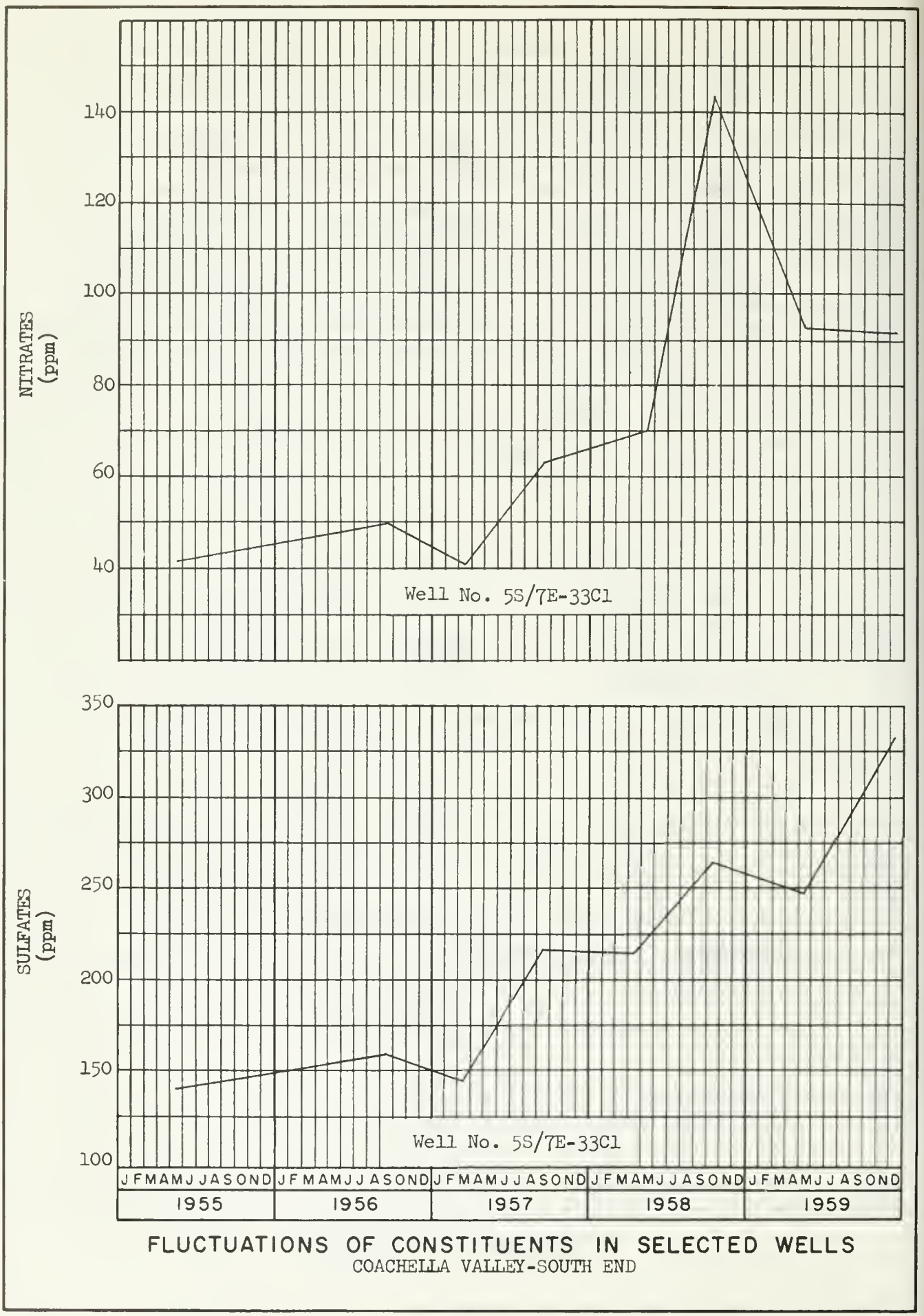
Significant Water Quality Changes. Comparison of analyses of ground water samples collected in 1959 with those of 1958 indicates that total dissolved solids content increased slightly for most of the monitored wells, continuing the trend to increase evident in data for the six years of record. Well 5S/7E-33C1, located about four miles southwest of the City of Indio continued to show large increases in mineral content. Nitrate content in water from this well decreased from the high value of 144 ppm shown in 1958 analyses to 93 ppm in 1959, remaining much above the recommended limit of 44 ppm for drinking water. The source of the nitrates has not been determined.

Well 6S/7E-25E1, located about four and one-half miles southwesterly of Thermal, showed a slight increase in mineral constituents in the past year. From 1954 to 1957 this well showed improvement of mineral quality, particularly in sulfate content. Well 7S/8E-22M1 showed continued high chlorides and sulfates, which increased significantly in 1956 and 1957. Well 7S/9E-16K1 located 3 miles northwest of Indio continued to show fluctuations in concentrations of constituents as well as variations in their relative proportions. Fluoride content of water from this well ranged from 5.7 to 6.2 ppm in 1959. Well 5S/8E-33N1, located about one mile northwest of Coachella, showed

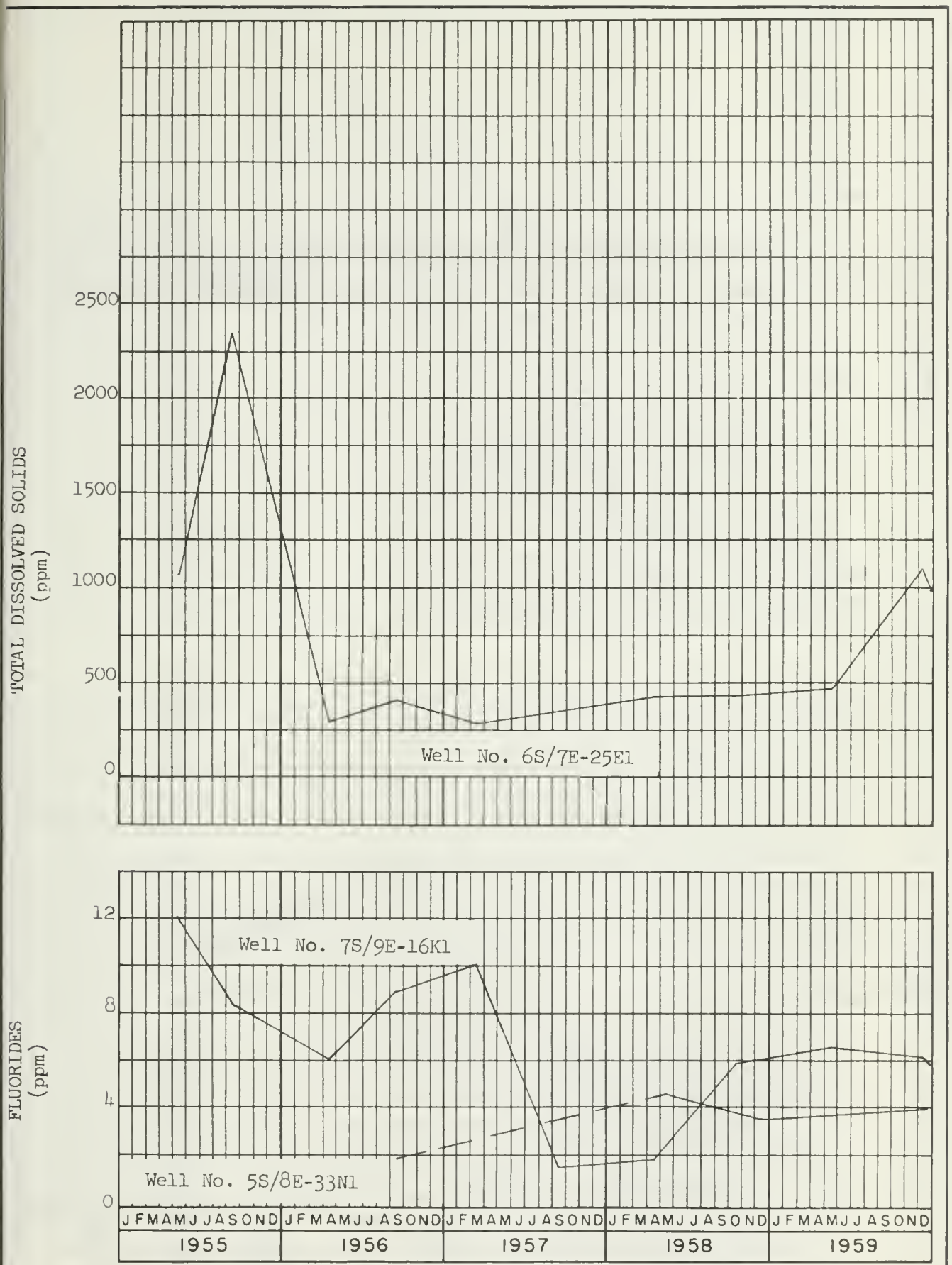
fluoride content of up to 4.0 ppm in 1959, although the analyses indicate that otherwise the water is of good mineral quality for domestic use.

The extremely variable characteristics of the ground water exhibiting impairment of quality make any attempt to identify the sources of degradation difficult. Increases in sulfate content in deeper aquifers of the lower Coachella Valley, however, are probably due to percolation of return flows from irrigation with Colorado River water.

WATER QUALITY RANGES
COACHELLA VALLEY-SOUTH END



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS
COACHELLA VALLEY-SOUTH END

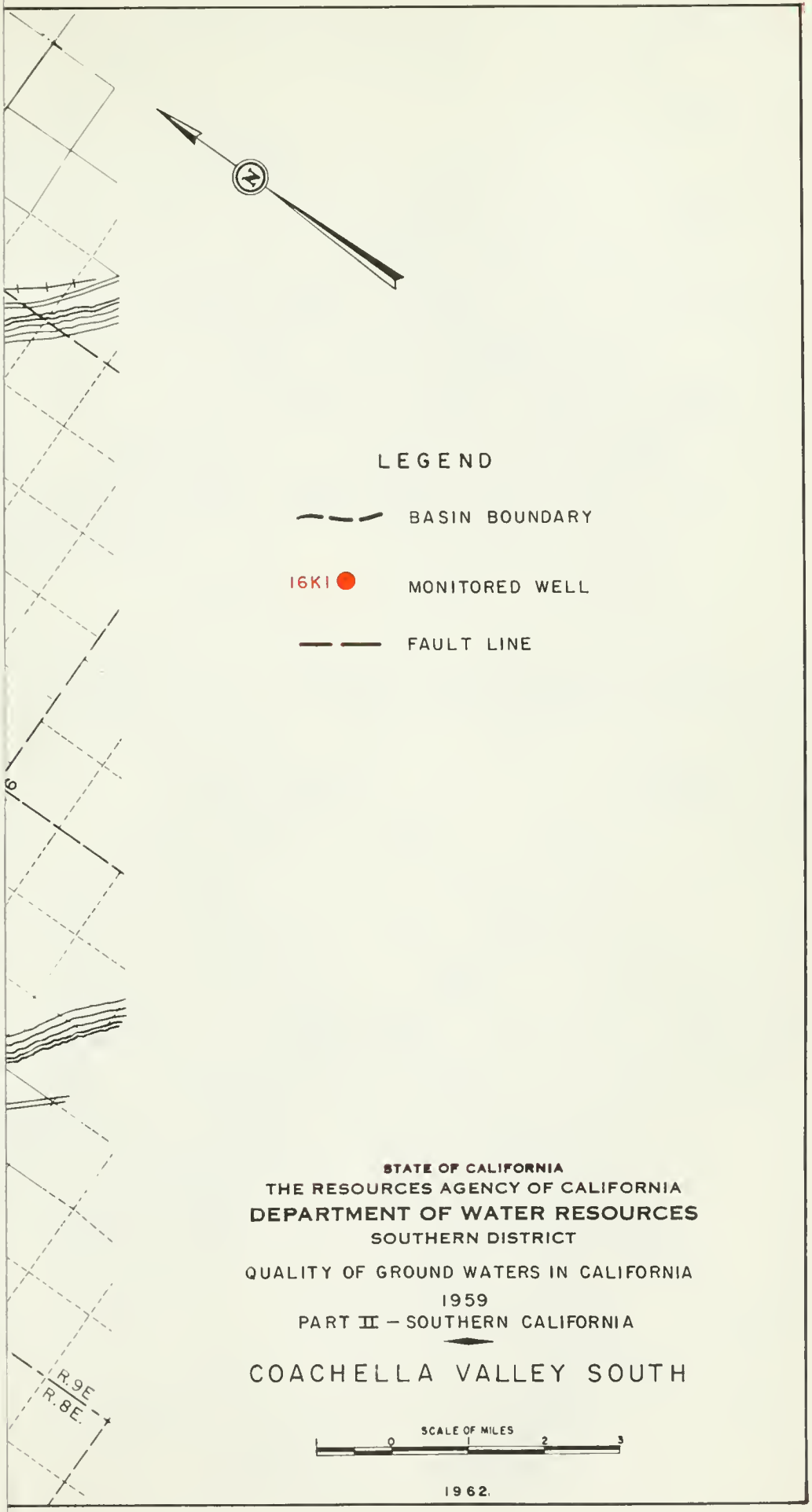


FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

COACHELLA VALLEY-SOUTH END

FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

COACHELLA VALLEY - SOUTH END



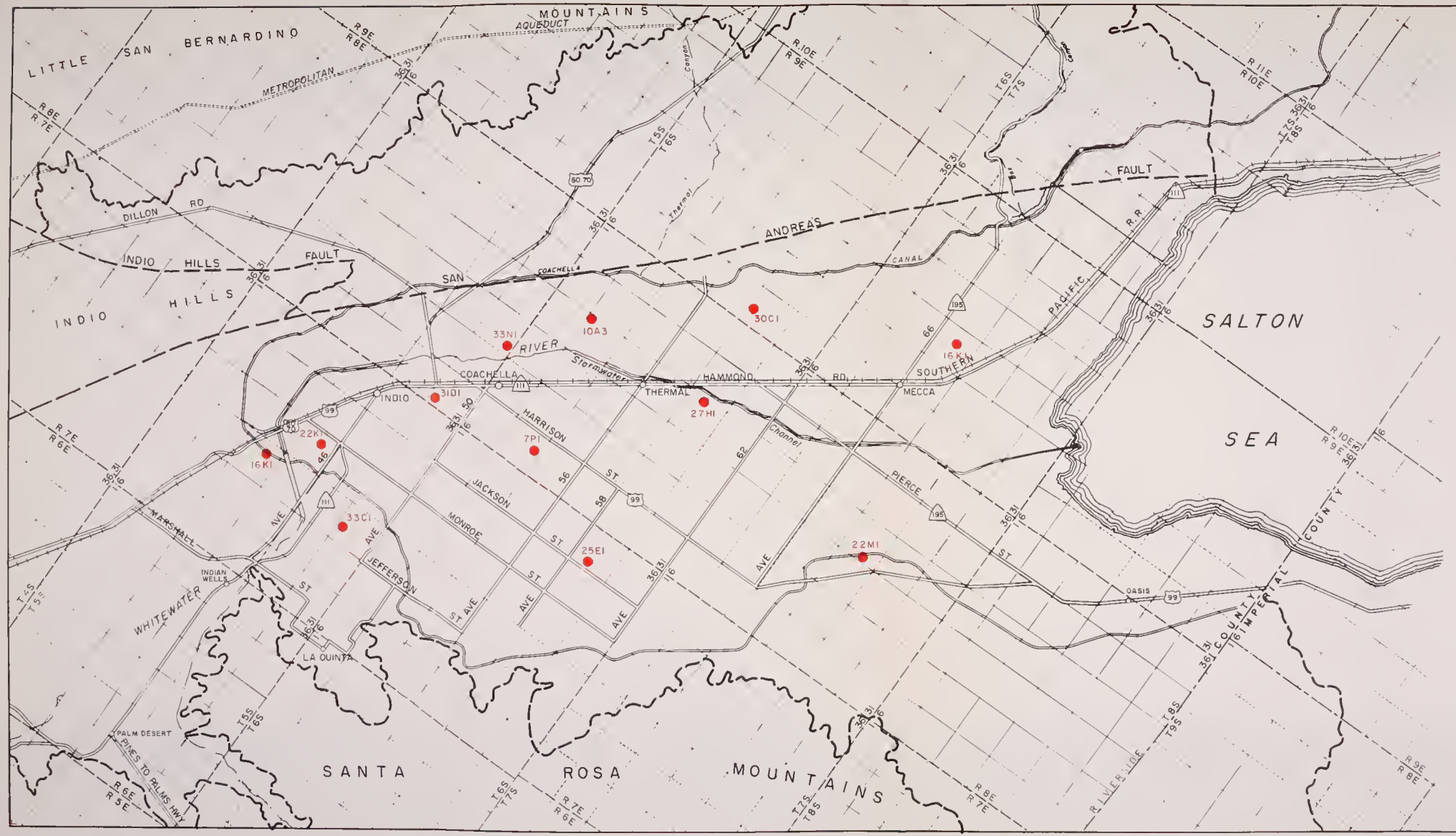
STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II – SOUTHERN CALIFORNIA

COACHELLA VALLEY SOUTH

SCALE OF MILES
0 1 2 3

1962.



LEGEND

- BASIN BOUNDARY
- 16K1 MONITORED WELL
- FAULT LINE

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II – SOUTHERN CALIFORNIA

COACHELLA VALLEY SOUTH

SCALE OF MILES 0 1 2 3

1962

Santa Ana Region (No. 8)

The Santa Ana Region encompasses the entire drainage area of the Santa Ana River. It includes portions of Los Angeles, San Bernardino, Riverside, and Orange Counties. Mountain ranges and hills bound the region on the northeast and southeast; the Pacific Ocean bounds it on the southwest, and the Los Angeles-Orange County line marks its northwestern boundary on the Coastal Plain. The Santa Ana River traverses the region in a southwesterly direction from the San Bernardino Mountains through the Upper Santa Ana Valley of the Santa Ana Narrows between the Puente Hills and Santa Ana Mountains, across the Orange County Coastal Plain, and flows to the ocean near Newport Beach.

Upper Santa Ana Valley has an average width of 40 miles north to south, 50 miles east to west, and an area of about 2,250 square miles. The Orange County Coastal Plain area extends inland from the ocean about 25 miles to the Santa Ana Narrows, has an average width of about 20 miles and an area of approximately 550 square miles.

Nine ground water basins and 27 subbasins have been identified in the region, three of which have ground water quality problems that warrant their inclusion in the ground water monitoring program. The basins, the number of wells sampled in each, and the times of sampling are listed in the following tabulation.

Monitored area	No. of wells	Sampling time
Anaheim Basin Pressure Area (8-1.01)	25	April and September
Chino Basin (8-2.01)	8	March, August and December
Bunker Hill Basin (8-2.06)	8	March, August and November

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The native quality of ground water in the Upper Santa Ana Valley has been generally good to marginal. Poorer quality waters are found in a few limited areas. Records of mineral analyses indicate that a small but noticeable general increase in mineral concentrations has occurred in the valley in the past thirty years.

All waste water in the upper valley is discharged to the ground surface or to stream channels, and deep percolation of these waste waters constitutes involuntary reclamation and a source of recharge to ground water. Use and reuse of ground water presents a threat of impairment of quality.

Surface and ground water outflow from the upper valley constitutes the principal natural source of recharge of ground water in the Orange County Coastal Plain. Most waste waters originating on the Coastal Plain are discharged to the ocean. Currently, Colorado River water is imported and spread along the Santa Ana River to recharge the ground water supplies; this source has provided the greatest amount of recharge water in recent years. Colorado River water is also distributed directly to the water users; however, ground water supplies about 80 percent of the water required for prevailing beneficial uses. Ground water levels remain below sea level along the coast in spite of the large ground water recharge program and sea water continues to invade the fresh ground water aquifers in the Coastal Plain.

Anaheim Basin Pressure Area (8-1.01)

Anaheim Basin Pressure Area, designated East Coastal Plain Pressure Area in previous reports of this series, is the seaward portion of the Orange County Coastal Plain. It extends from the Los Angeles County line on the northwest, 15 miles along the ocean front to the San Joaquin Hills on the south. Its average inland width is about 10 miles, and its area is about 180 square miles; boundaries are shown on Plate 10.

The topography is that of a low, gently sloping coastal plain, with a series of mesas along the coastal margin separated by gaps. Santa Ana River traverses the plain, and flows to the ocean through Santa Ana Gap just north of Newport Beach.

Ground Water Occurrence. The major water-bearing deposits include continental and marine sediments of Recent, Pleistocene, and Pliocene age. In these sediments several aquifers have been identified, one below another. At the surface there is an unconfined body of perched water consisting largely of irrigation return and other waste waters above the confining sediments of the deeper aquifers. In order of depth these principal aquifers are the Talbert aquifer of Recent age in Santa Ana Gap, and its correlative Bolsa aquifer in the northwesterly portion of the basin, ranging from about 50 feet to nearly 200 feet below the ground surface; the Alpha, Beta, Meadowlark and Lamb aquifers in the Pleistocene deposits, ranging in depth to about 600 feet; the Pleistocene Silverado aquifer which may reach depths exceeding 1,000 feet; and the "Pico Aquifer" of Pliocene age ranging to more than 3,000 feet. In the principal aquifers well yields range up to 2,000 gallons per minute.

The principal aquifers reach their greatest depths and thicknesses in the central portion of the basin, and extend to the ocean between and beneath the coastal mesas. Faults parallel to the coastline impede sea water inflow to the Pleistocene and Pliocene aquifers but not, however, to the Recent sediments.

Ground Water Development and Use. Ground water resources are extensively developed and production exceeds safe yield. Irrigated agriculture is the principal user of ground water, but rapid urban development is supplanting former agricultural lands. Water demand is increasing along with population growth. Imported water supplements ground water used for domestic and industrial purposes. Imported water is also spread in the Santa Ana Forebay area for replenishment of ground water.

Major Waste Discharges. Municipal wastes are collected by sewers and discharged to the ocean after treatment. A limited amount of sewage treatment plant effluent is used for irrigation. Brines produced by the petroleum industry are conveyed to the ocean by pipelines. Past disposal of oil brines to unlined earth sumps continues to influence ground water quality adversely in certain areas.

Monitoring Program. The monitoring program was instituted in 1953 to detect any extension of areas adversely affected by past oil field brine disposal and to report on the status of sea-water intrusion. In 1959, 41 samples were collected from 24 wells in the program.

Evaluation of Water Quality. The mineral quality of native ground water was generally good to excellent. Ground water of higher mineral concentration occurred along the coastal fringe of the aquifers where early

ground water analyses indicated that some saline waters were present even before ground water supplies were developed.

The character of water in the Recent and upper Pleistocene deposits is generally calcium bicarbonate. Percent sodium increases with depth to a marked degree in the lower Pleistocene and upper Pliocene deposits and the character of these waters is predominantly sodium bicarbonate.

Ranges of significant constituents from 1959 analyses of ground water samples are:

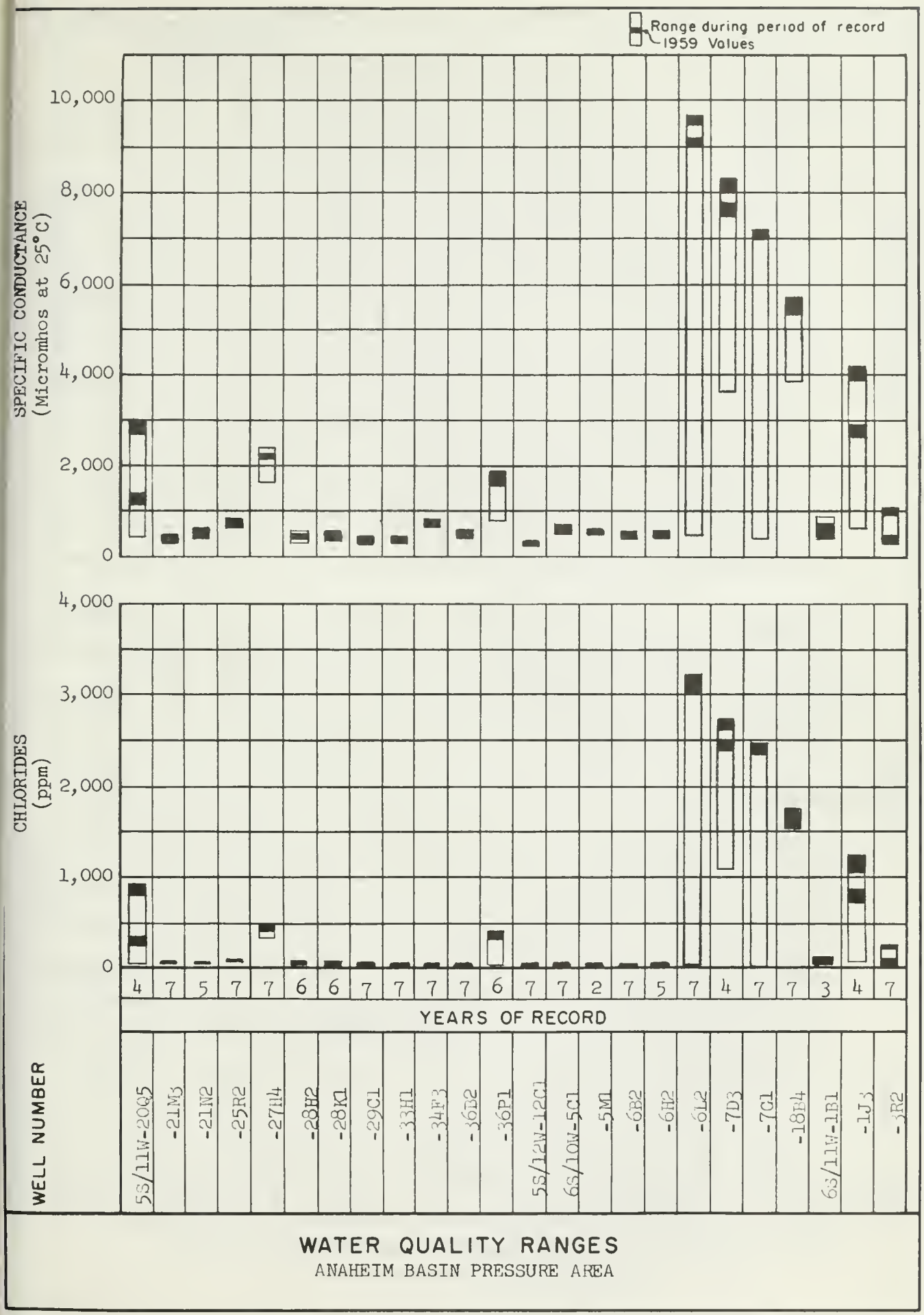
Total dissolved solids	222 to 7,902 ppm
Chloride	6 to 3,840 ppm
Sulfate	0.2 to 337 ppm
Percent sodium	12 to 82

Significant Changes in Ground Water Quality. A depression of the pressure surfaces in the Talbert and Bolsa aquifers to elevations below sea level has induced intrusion of sea water into these aquifers. Analyses of ground water samples collected from the Talbert aquifer in Santa Ana Gap indicate the continued advance of sea-water intrusion in this aquifer. Ground water containing 500 ppm chloride was found as far as three miles inland from the coastline. The location of the 500 ppm chloride line is shown on the following map and the continued increases of chloride ion concentration in the ground water, seaward of this line, are shown graphically for well 6S/11W-1J3, located two miles northeast of Huntington Beach.

Some of the degradation appears to be the result of past disposal of oil brines to unlined sumps on the mesas adjacent to the Santa Ana Gap. However, at present, the major source of ground water degradation has become ocean water intrusion.

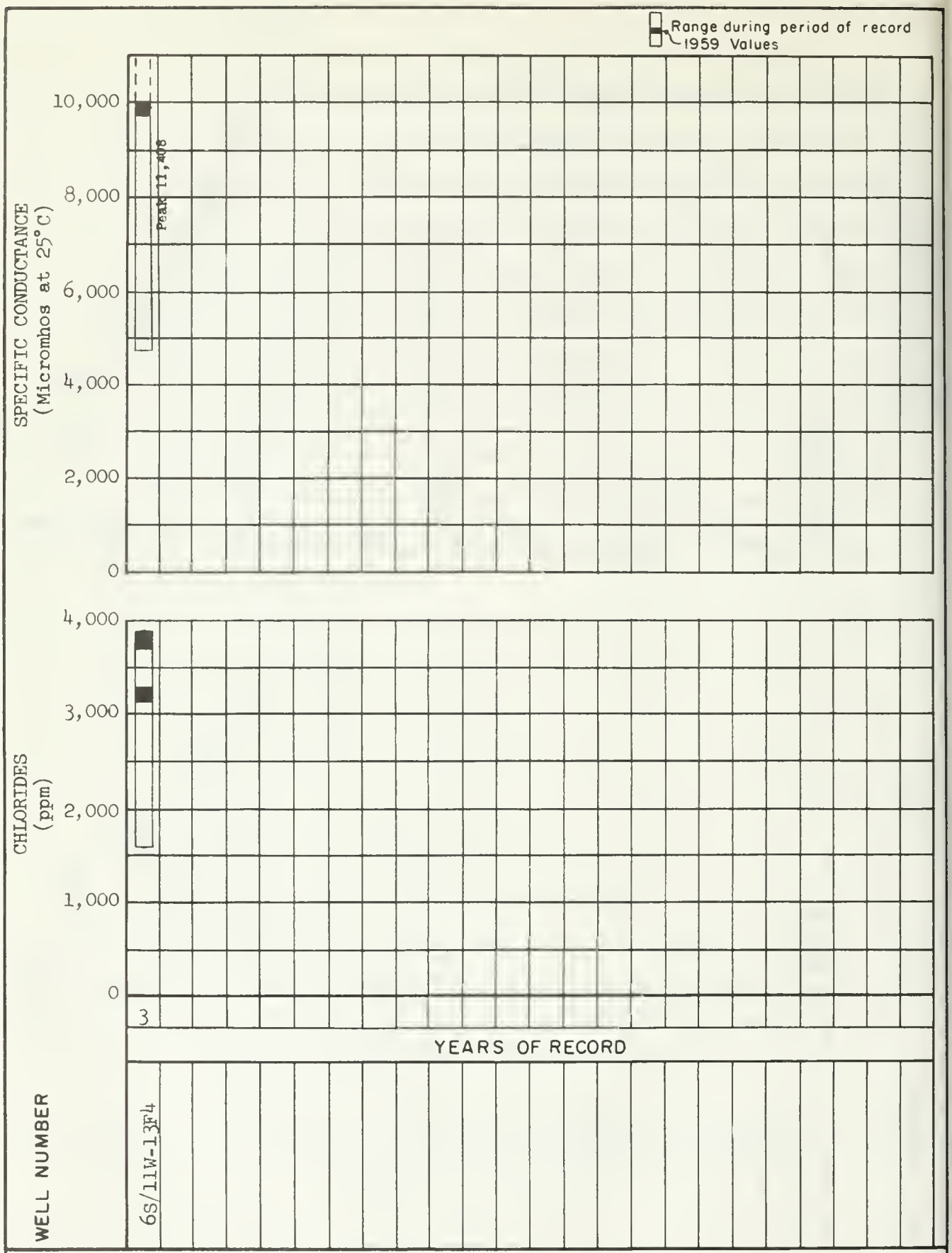
Analyses of well waters from Bolsa Chica Mesa revealed that a body of saline water was spreading in aquifers beneath the mesa, inland from the fault zone. Initial chloride increases were shown by analyses of samples from wells one-half mile landward of the faults. Chlorides for well 5S/11W-20Q5 located about one mile east of Sunset Beach are plotted on the following chart to illustrate these increases. The source of this degradation has not been established as yet.

Although the fault zone appears to have effectively sealed off the deeper aquifers from direct invasion by sea water up to the present time, sea water and other brines may degrade the ground water in these aquifers beyond the zone of faulting by vertical percolation from the overlying shallower aquifers.



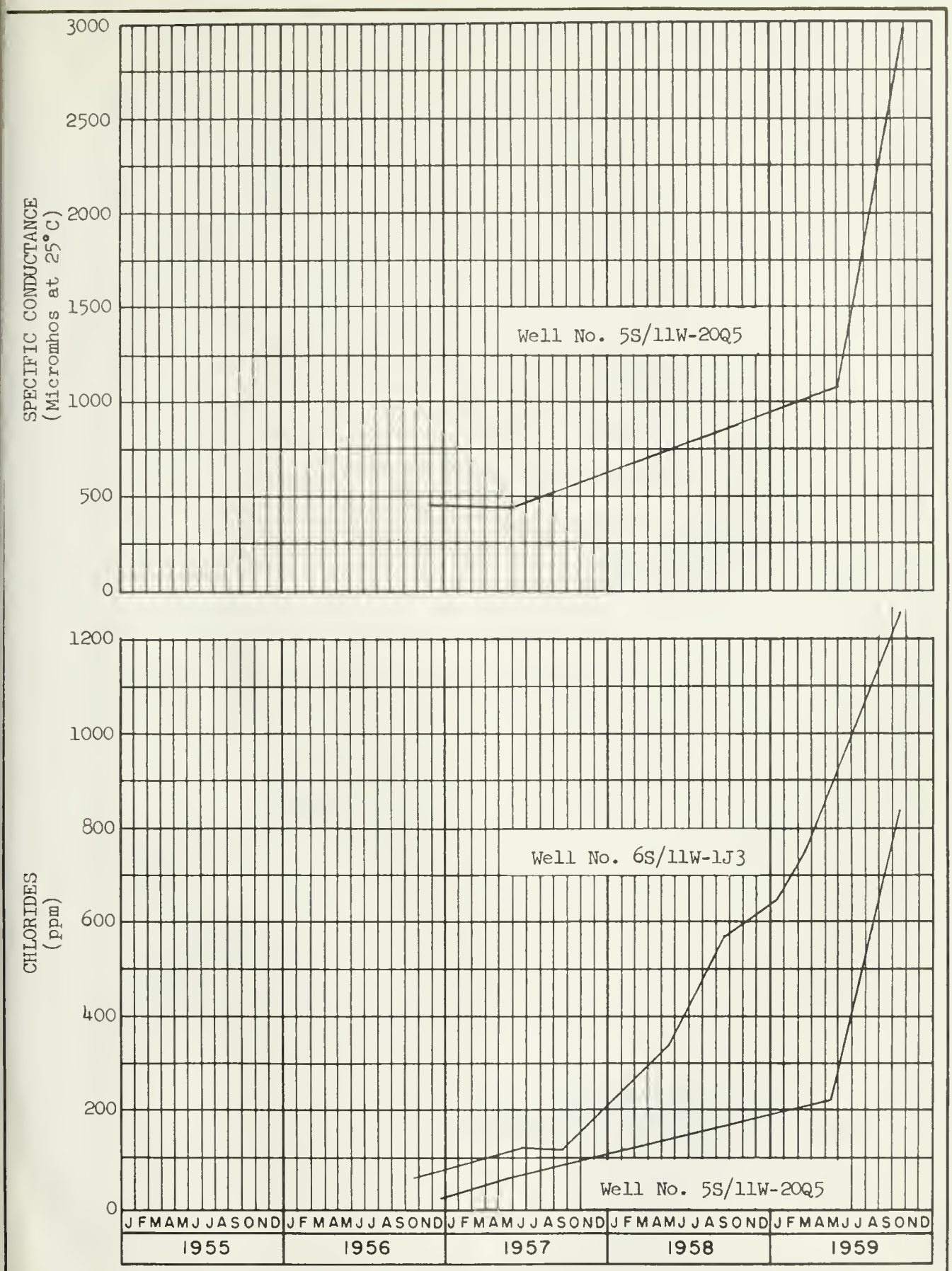
WATER QUALITY RANGES

ANAHEIM BASIN PRESSURE AREA



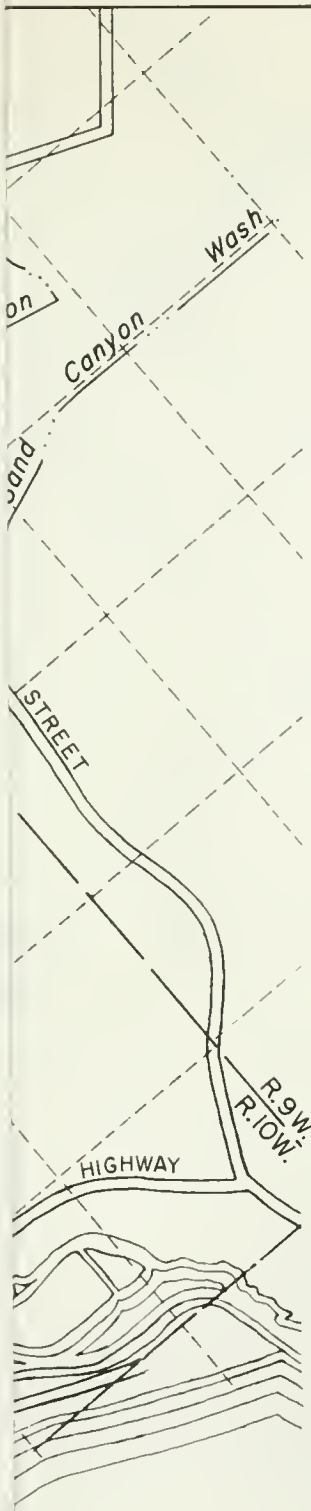
WATER QUALITY RANGES

ANAHEIM BASIN PRESSURE AREA



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

ANAHEIM BASIN PRESSURE AREA



LEGEND

3R2 ● MONITORED WELL

FAULT LINES

AREA OF CHLORIDE CONCENTRATIONS GREATER THAN 500 PPM SPRING OF 1959

STATE OF CALIFORNIA
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DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II — SOUTHERN CALIFORNIA

ANAHEIM BASIN PRESSURE AREA

SCALE OF MILES
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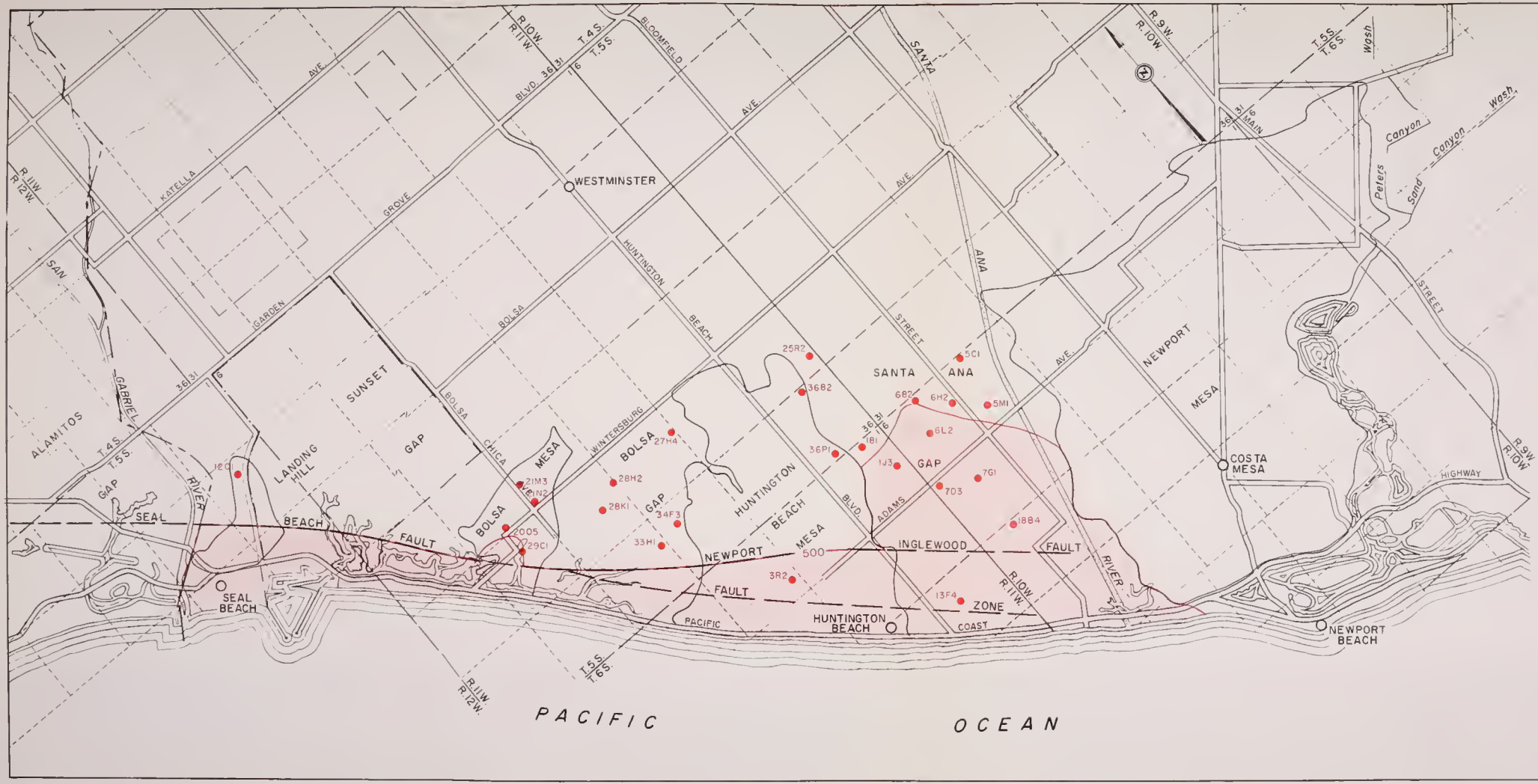

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II — SOUTHERN CALIFORNIA

ANAHEIM BASIN PRESSURE AREA

SCALE OF MILES

1962

Chino Basin (8-2.01)

Chino Basin is located in the northwestern part of the large Upper Santa Ana Valley. It is bounded by the San Gabriel Mountains on the north, Puente Hills on the west and southwest, Jurupa Mountains and Pedley Hills on the south, and subsurface barriers on the east. The basin is about 20 miles in length, 12 miles in width, and has an area of 237 square miles. The major portion of the Chino Basin is in San Bernardino County, its southern part is in Riverside County, and a small western fringe is in Los Angeles County, as shown on Plate 11.

The principal stream draining the Chino Basin is Chino Creek, which, together with several small streams, flows from the San Gabriel Mountains southward across the Chino Basin to the Santa Ana River. The Santa Ana River flows westerly along the southern margin of the basin.

Ground Water Occurrence. Ground water is obtained from the alluvial sediments in the basin. These sediments are of Recent and Pleistocene age and comprise, essentially, a single aquifer. In the upper portion of the valley the sediments consist chiefly of coarse gravels, and ground water is unconfined. Along the southwestern margin of the valley, ground water is confined under pressure by fine grained flood plain sediments. Faults along the northeasterly boundary of the basin impede ground water inflow from adjacent basins. Wells yield from 135 gpm to more than 1,800 gpm.

Ground Water Development and Use. Development of ground water for agricultural and municipal uses is extensive and a general condition of overdraft exists. The greatest amount is used by irrigated agriculture; however, the development of industrial and residential areas is increasing the demand on the ground water supply. Colorado River

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water is imported to supplement ground water supplies, and minor amounts of ground water are imported to or exported from the basin.

Major Waste Discharges. Domestic sewage and industrial waste water consisting of cooling water, food processing, and aircraft washing wastes, constitute the major waste discharges. Almost all waste waters in the basin are returned to the land for disposal or are used for irrigation. A substantial quantity of waste water is imported from the City of Riverside for irrigation, while a minor amount of waste water is exported to the Pomona Tri-city sewage treatment plant in Pomona.

Hexavalent chromium and phenolic compounds in ground water have been traced to industrial waste disposal in the past. In 1959, there were no indications that these constituents continued to present water quality problems.

Monitoring Program. The monitoring program was instituted in 1953 to detect possible impairment of ground water quality that could result from local disposal of domestic and industrial wastes, deep percolation of irrigation water, or use of water imported from the Colorado River. Wells for monitoring were selected from among wells located near significant waste discharges. In 1959, 25 samples were collected from eight monitoring wells.

Evaluation of Water Quality. The native ground water quality was generally good to excellent for all prevailing beneficial uses. It was predominantly calcium-bicarbonate in character and moderately hard to very hard water. The waters were usually class 1 for irrigation use and acceptable for domestic use. Unimpaired ground water preserves these characteristics at the present time.

Harder waters containing greater concentrations of total dissolved solids are found in the southwestern portion of the basin, reflecting the high mineral content of runoff from Puente Hills.

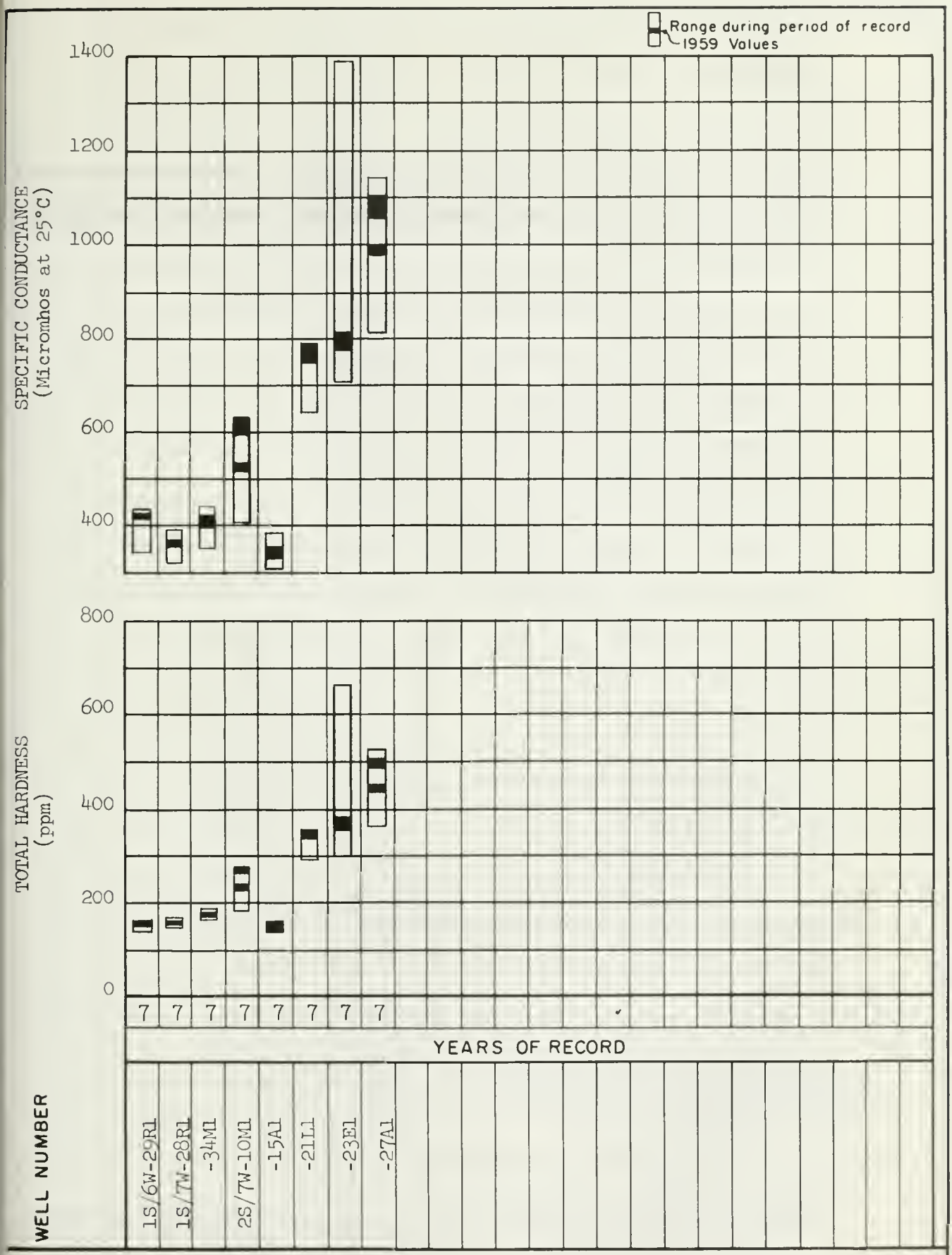
Ranges for significant constituents in 1959 are: Total dissolved solids from 207 to 830 ppm, chloride from 5 to 62 ppm, and nitrates from 3.4 to 69 ppm.

Significant Changes in Ground Water Quality. Analyses of ground water samples collected in 1959 indicate that a slight increase had occurred in total dissolved solids, chloride, and nitrate content in the preceding year. Increases in total dissolved solids and chloride are believed to be due to use and reuse of water in the basin. Moderately high nitrate values are found in well waters in the northwestern portion of the valley, where there are no known local waste discharges, and have been attributed to overfertilization of crops. In the southeastern portion of the valley, ground water from wells in the vicinity of sewage treatment plant discharges have shown nitrate contents exceeding the recommended limit of 44 ppm for drinking water at various times over the seven years of record. Analyses of ground water samples from well 2S/7W-23E1 located about six miles southeasterly from Chino shows a record of 94 ppm nitrate in 1953 to 45 ppm in 1959. Ground water from well 2S/7W-21L1, located about five miles south of Ontario, shows a nitrate content of 48 ppm in 1954 increasing to 69 ppm in 1959. The changes are illustrated on the accompanying charts.

A departmental report on "Ground Water Quality Objectives, Chino Basin," March 1957, to the Santa Ana Regional Water Pollution Control Board concluded that most of the industrial waste disposal problems had been eliminated through controls instituted by the board.

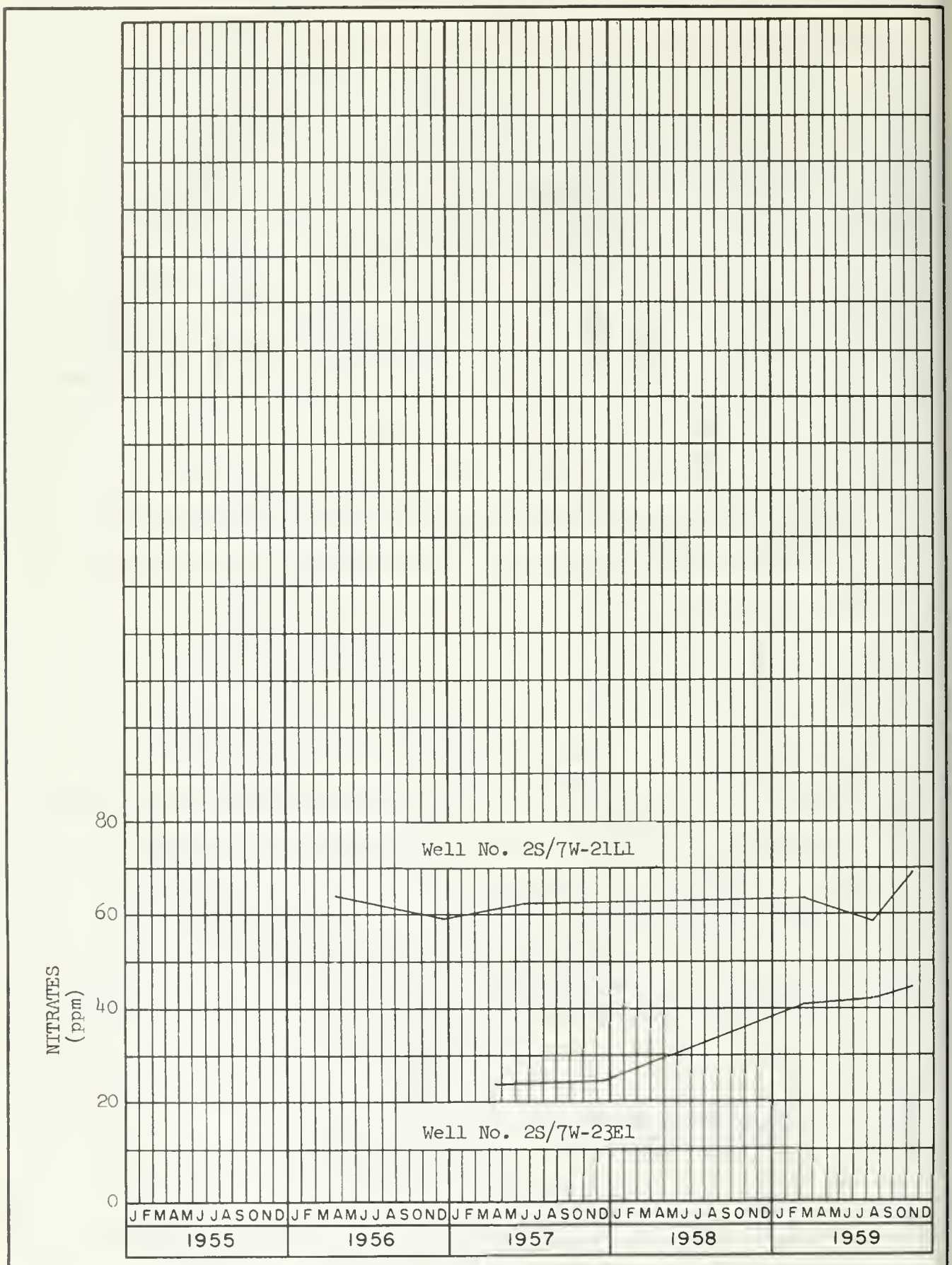
Examination of all ground water quality data reveals that a slow but continuing increase in dissolved minerals is occurring. Past and present local disposal of substantially all waste water and the resultant reuse of ground water promises to maintain this trend.

Quality changes that have been detected have occurred in the shallower ground waters. At present there is little indication that deeper wells have been affected.

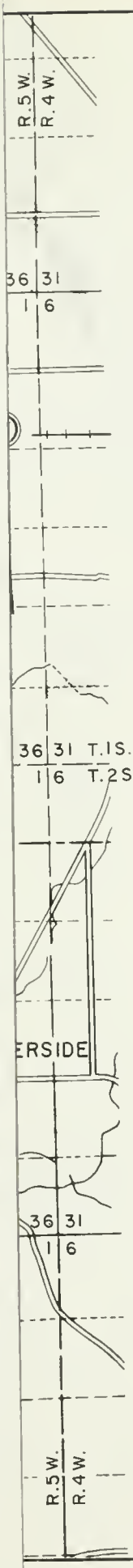


WATER QUALITY RANGES

CHINO BASIN



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS
CHINO BASIN



LEGEND

BASIN BOUNDARY

10MI MONITORED WELL

FAULT LINE

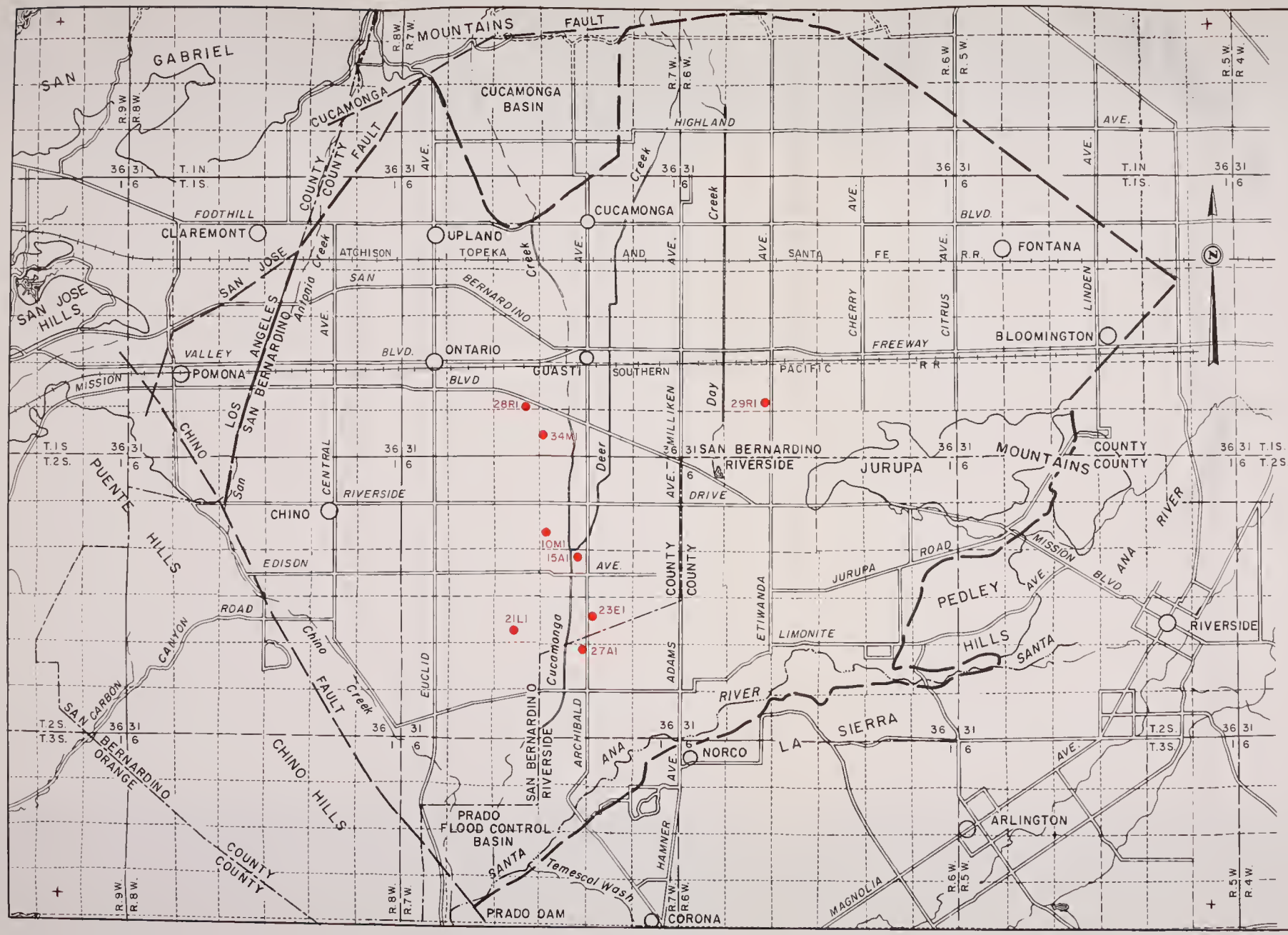
STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART III SOUTHERN CALIFORNIA

CHINO BASIN

SCALE OF MILES
0 1 2 3

1962



LEGEND

- BASIN BOUNDARY
- ● 10M1 MONITOREO WELL
- FAULT LINE

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART III SOUTHERN CALIFORNIA

CHINO BASIN

1962

Bunker Hill Basin (8-2.06)

The Bunker Hill Basin is situated in the Upper Santa Ana Valley, extending 20 miles along the lower slope of the San Bernardino Mountains which bound it on the north. Its average width is about eight miles, and its area is about 92 square miles; Plate 12 indicates boundaries.

The Santa Ana River and tributary streams drain its surface, flowing generally southwesterly across the basin. Subsurface outflow is controlled to a large degree by a number of faults. Chief in importance of these is the San Jacinto fault which affects ground water movement into the Colton Basin adjoining it on the southwest.

Ground Water Occurrence. Ground water is obtained from the alluvial sediments of Recent and Pleistocene age which increase in thickness from zero at the foot of the mountains to about 1,000 feet in the southwestern portion. Near the mountains, coarse gravels represent the sediments in coalescing alluvial cones below the mountain canyons and free ground water conditions prevail. In the southwest portion, interbedded permeable and relatively impermeable strata create an area of confined ground water. Well yields range from 180 to 1,200 gpm.

Ground Water Development and Use. Ground water is developed extensively for agricultural and municipal needs; it provides for almost all local requirements and, in addition, large volumes are exported from the basin for use in adjacent areas.

Major Waste Discharges. Industrial wastes and domestic sewage constitute the major waste discharges. These wastes are discharged to the surface of the land or to stream channels.

Monitoring Program. The monitoring program was instituted in 1953 after an investigation by the Division of Water Resources found that waste

Bunker Hill Basin (8-2.06)

The Bunker Hill Basin is situated in the Upper Santa Ana Valley, extending 20 miles along the lower slope of the San Bernardino Mountains which bound it on the north. Its average width is about eight miles, and its area is about 92 square miles; Plate 12 indicates boundaries.

The Santa Ana River and tributary streams drain its surface, flowing generally southwesterly across the basin. Subsurface outflow is controlled to a large degree by a number of faults. Chief in importance of these is the San Jacinto fault which affects ground water movement into the Colton Basin adjoining it on the southwest.

Ground Water Occurrence. Ground water is obtained from the alluvial sediments of Recent and Pleistocene age which increase in thickness from zero at the foot of the mountains to about 1,000 feet in the southwestern portion. Near the mountains, coarse gravels represent the sediments in coalescing alluvial cones below the mountain canyons and free ground water conditions prevail. In the southwest portion, interbedded permeable and relatively impermeable strata create an area of confined ground water. Well yields range from 180 to 1,200 gpm.

Ground Water Development and Use. Ground water is developed extensively for agricultural and municipal needs; it provides for almost all local requirements and, in addition, large volumes are exported from the basin for use in adjacent areas.

Major Waste Discharges. Industrial wastes and domestic sewage constitute the major waste discharges. These wastes are discharged to the surface of the land or to stream channels.

Monitoring Program. The monitoring program was instituted in 1953 after an investigation by the Division of Water Resources found that waste

discharges to the ground surface from a zeolite manufacturing plant near the City of San Bernardino had adversely affected the ground water in the vicinity of the plant. Additional wells were later selected to monitor possible effects on ground water quality of discharges of waste waters to the land from a military air base and from the City of Redlands sewage treatment plant. In 1959, 23 samples were collected from eight monitoring wells.

Evaluation of Water Quality. The character of ground water in the Bunker Hill Basin is predominantly calcium carbonate. It ranges from moderately hard to very hard water, but meets the standards recommended for mineral quality of drinking water, and is class 1 for irrigation use.

Ranges in concentrations of significant constituents in 1959 were: total dissolved solids from 133 to 515 ppm, nitrates from 0.5 to 29 ppm, and chlorides from 2 to 32 ppm.

Significant Changes in Ground Water Quality. Comparison of mineral analyses of ground water samples obtained in 1959 with those of the preceding six years indicates that minor fluctuations in mineral concentrations have occurred, but that there is no definite indication of any trend except as noted in the following discussion.

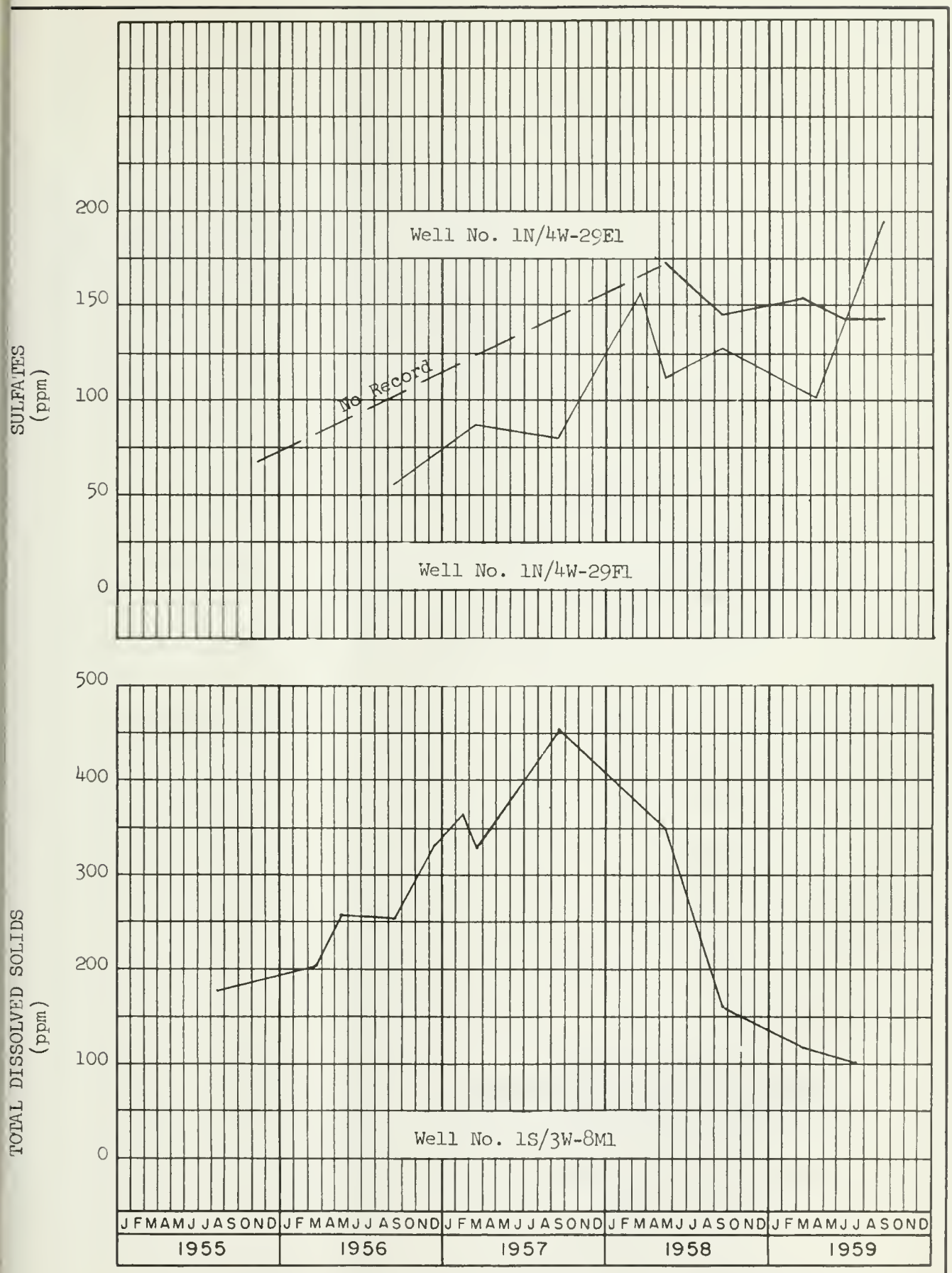
Ground water from well 1S/3W-8M1, located downstream of the City of Redlands sewage treatment plant, shows a continuous increase in total dissolved solids content from 178 ppm in August 1955 to 435 ppm in July 1959.

Ground water from wells 1N/4W-29E1 and 1N/4W-29E3, located about one mile south of the disposal area of the Culligan Zeolite Company, and well 1N/4W-29F1, located three-fourths mile southeast, have shown marked increases in mineral content during the five-year period 1955-1959.

The mineral analyses show that the increase in mineralization was due primarily to gains in calcium and sulphate concentrations with parallel increases in chloride. Boron also showed slight but noticeable increases.

WATER QUALITY RANGES

BUNKER HILL BASIN



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

BUNKER HILL BASIN

LEGEND

BASIN BOUNDARY

9E2 ● MONITORED WELL

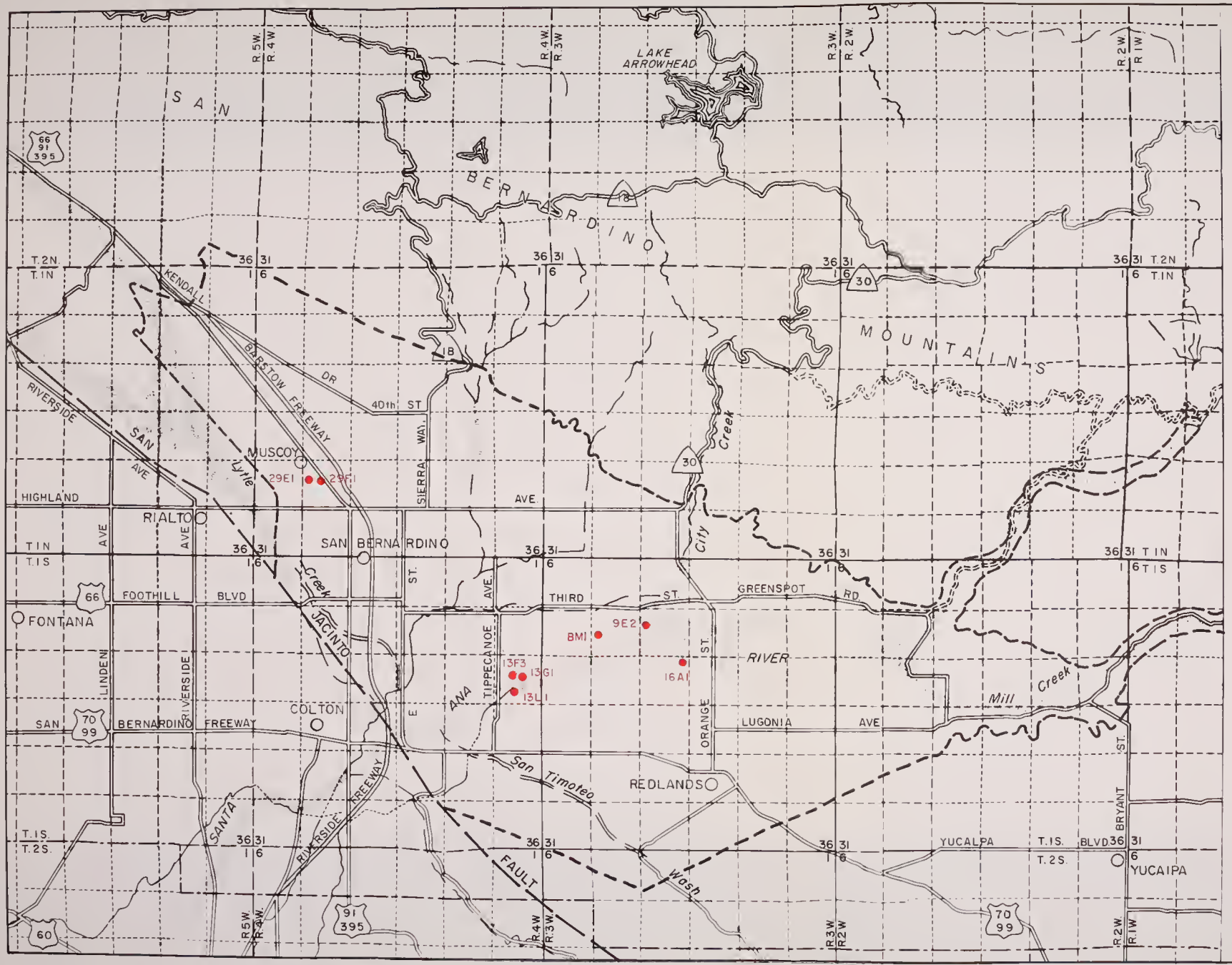
STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II — SOUTHERN CALIFORNIA

BUNKER HILL BASIN

SCALE OF MILES
1 0 1 2 3

1962



LEGEND

BASIN BOUNDARY

9E2 MONITOREO WELL

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II — SOUTHERN CALIFORNIA

BUNKER HILL BASIN

SCALE OF MILES 0 2 5

1962

San Diego Region (No. 9)

The San Diego Region is the drainage area of streams flowing to the ocean between the City of Corona Del Mar in Orange County and the California-Mexico boundary. It includes portions of Orange, Riverside, and San Diego Counties. It extends about 90 miles along the coast, its average width is about 45 miles, and its area is approximately 3,830 square miles. Most of its surface is mountainous or hilly except for a narrow coastal belt which slopes gently to the ocean and consists of a number of wave cut terraces or mesas.

Ground water is found in the alluvium of the stream valleys or shallow alluvial fill of inland valleys. Fifty-four basins have been identified in the region; however, only three areas are included in the monitoring program. These three areas, the number of wells sampled in each, and the sampling times are:

Monitored area	No. of wells	Sampling time
San Luis Rey Valley Mission Basin (9-7.01)	11	March and August
El Cajon Valley (9-16)	10	June and December
Tia Juana Valley Basin (9-19)	11	March and October

Precipitation in the region during the 1958-1959 season was much below normal. Both surface and underground water storage declined. Only small increases in average mineral content are indicated by analyses of ground water samples collected in 1959 for ground waters in the San Luis Rey Valley Mission Basin or El Cajon Valley, but increases in the ranges of certain constituents showed that areal differences in quality within these basins were becoming more prominent. The small change in

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average quality from 1958 to 1959 is probably due to the carryover effects of the greater recharge of good quality water resulting from the higher than normal precipitation of the 1957-1958 season. In the Tia Juana Valley Basin, however, a significant increase in average mineral content was shown by 1959 ground water analyses data.

Increasing availability and distribution of Colorado River water in the coastal areas has minimized dependence on local ground water supplies. However, the ground water basins are gaining in importance as reservoirs for storage of excess import water as well as local water.

San Luis Rey Valley, Mission Basin (9-7.01)

The Mission Basin occupies the lower, or oceanward, end of the San Luis Rey River Valley in San Diego County. It extends from the ocean eight miles inland to the Bonsall Narrows. The area of the basin is about six square miles; boundaries are shown on Plate 13, "Mission Basin, San Luis Rey Valley."

Ground Water Occurrence. Ground water is obtained primarily from the unconsolidated Recent and Pleistocene age alluvium along the San Luis Rey River Channel. The Recent alluvium, consisting of highly permeable sands and gravels, is chiefly unconfined, but near the ocean fine grained sediments partially confine ground water in that area. The alluvium extends into the ocean and is open to intrusion by sea water.

Underlying and flanking the alluvium are deposits of marine sediments consisting of slightly cemented sands with occasional beds of shale or sandy shale. These marine deposits, which are only slightly permeable, contain connate water, poor in quality and high in chlorides.

The yield from wells in the alluvium range up to 2,180 gpm and average 500 gpm.

Ground Water Development and Use. Ground water is extensively developed for irrigation and about 25 percent of the municipal water requirements of the cities of Oceanside and Carlsbad are obtained from wells in the basin. As a result of these developments, a condition of overdraft exists in the coastal portion of the basin.

Major Waste Discharges. The major waste discharge is the effluent from the City of Oceanside Sewage Treatment Plant that is imported to the basin by pipeline and pumped into Whelan Lake. The effluent has been used for irrigation following oxidation treatment in Whelan Lake. In October 1958,

ground water replenishment operations were begun by discharge of effluent from overflow of the lake to spreading grounds in the San Luis Rey River Channel.

A significant waste discharge occurs from a sand and gravel washing operation which utilizes saline ground water. Formerly the waste was discharged at a point two miles from the ocean, but in 1959 was discharged to a point farther upstream where the sediments are highly permeable.

Monitoring Program. A ground water monitoring program was instituted in 1953 to study water quality effects resulting from sea-water intrusion, inflow of connate waters from marine sediments which underlie and flank the river alluvium, and salt balance. During 1959, 17 samples were obtained from 11 monitoring wells.

Evaluation of Water Quality. The character of water in the basin is extremely variable. Calcium, sodium, bicarbonate, and chloride ions, predominate. The water is hard to very hard and high in total dissolved solids and chloride. The quality varies from good to unacceptable according to the drinking water standards and from class II to III for irrigation.

Significant Changes in Ground Water Quality. Ground water quality changes during the past two years have been strongly influenced by variations in annual precipitation rates. The 1957-1958 rainfall year produced greater than normal precipitation after five years of below normal precipitation. The 1958-1959 rainfall was much below normal and as a result ground water levels and associated ground water quality changes reflect the precipitation and recharge changes. Ground water levels recovered substantially from 1957 to 1958 and ground water quality showed general improvement in

the period. In 1959 ground water levels declined and a general deterioration of quality occurred.

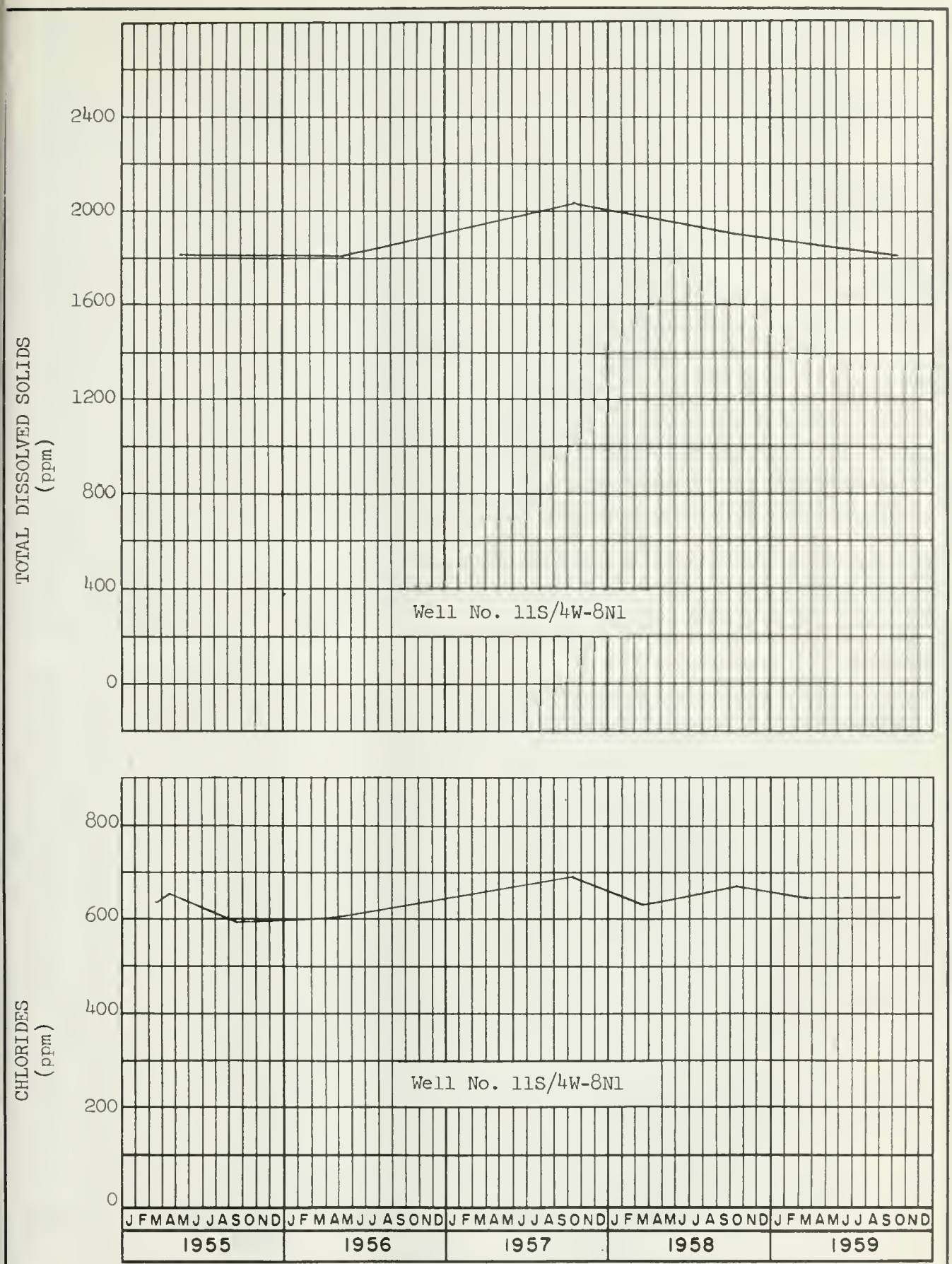
The wells on the monitoring program are divided into two groups for studies of water quality changes. Sea-water intrusion was evident near the ocean before 1953. Ground water from well 11S/5W-23E1, located 0.7 miles from the ocean, has exhibited continuing increases in total dissolved solids and chloride in the seven years of record. Ground water from well 11S/5W-13Q1, located 2.4 miles from the ocean, showed marked increases in total solids and chloride between 1958 and 1959. The absence of wells which could be sampled in the area of intrusion makes the advance of sea water difficult to follow, but the available data indicate that the intrusion has been continuous and that waters containing more than 1,000 ppm chloride advanced by 1959 to a point two miles inland from the coast.

Analyses of ground water samples collected from three wells near the City of San Luis Rey, 11S/4W-8H1, 8J1, and 8N1, showed chloride content ranging from 472 to 653 ppm in 1959 and total dissolved solids from 1,664 to 1,826 ppm. These high values are attributed to degradation by inflow of connate waters from the marine sediments.

There are no wells available for ground water monitoring immediately below the sewage treatment plant effluent recharge area. No changes in ground water quality in existing wells downstream from this discharge were shown by 1959 analyses. Mineral analyses of the effluent from Whelan Lake in 1959 showed it to be inferior in mineral quality to local ground water. The 1959 data for the effluent water show the following ranges of significant constituents: total dissolved solids 1,600 to 1,690 ppm; chloride 340 to 496 ppm; and boron 0.78 to 2.2 ppm. In 1959, the flow to the recharge area averaged about two million gallons a day.

WATER QUALITY RANGES

SAN LUIS REY VALLEY - MISSION BASIN



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

SAN LUIS REY VALLEY, MISSION BASIN

FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

SAN LUIS REY VALLEY, MISSION BASIN

LEGEND

BASIN BOUNDARY

13L1 MONITORED WELL

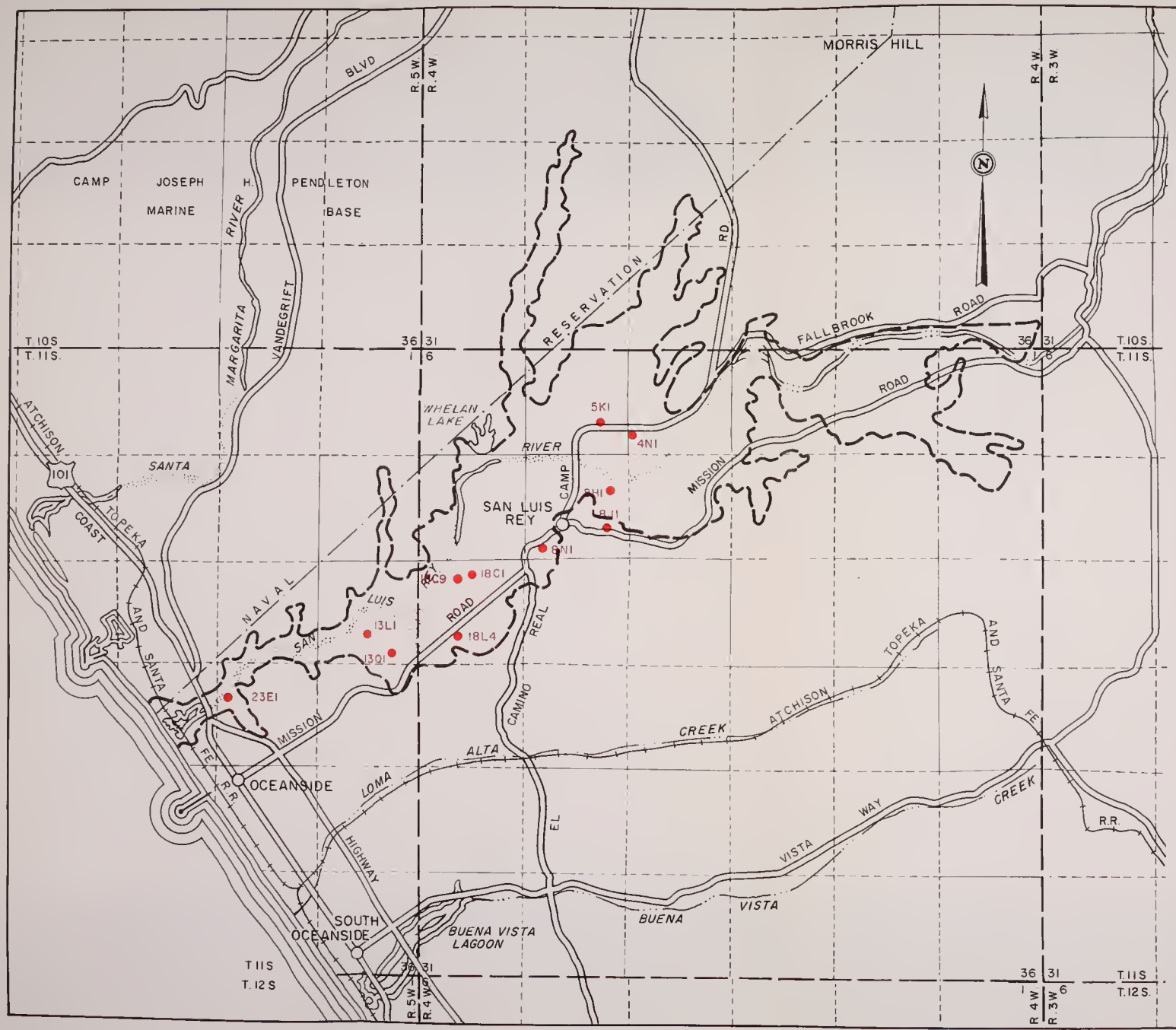
STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II — SOUTHERN CALIFORNIA

SAN LUIS REY RIVER—MISSION BASIN

SCALE OF MILES
1 ½ 0 1

1962



LEGEND

BASIN BOUNDARY

13L1 MONITORED WELL

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II — SOUTHERN CALIFORNIA

SAN LUIS REY RIVER—MISSION BASIN

SCALE OF MILES
½ 0

1962

El Cajon Valley (9-16)

The El Cajon Valley is a small basin in San Diego County about 10 miles east of the City of San Diego. It is about four miles wide and five miles long, and has an area of about 22 square miles. The basin is bounded by low hills, and opens into San Diego River Valley; boundaries are shown on Plate 14, "El Cajon Basin."

Ground Water Occurrence. Ground water is obtained principally from fractured and weathered zones in crystalline rocks. The Recent alluvium which extends throughout the basin to depths of about 50 feet in some areas, is practically devoid of water. Sediments of Tertiary age yield very little water because their permeabilities are low. Well yields range from 1 to 300 gpm.

Ground Water Development and Use. Ground water development is extensive for domestic uses and to a lesser extent for agriculture and municipal supplies. Ground water is insufficient to meet demand, and Colorado River water is imported as a supplementary supply.

Major Waste Discharges. Effluent waste waters from two sewage treatment plants constitute the major waste discharges. The effluents are used for irrigation of parks and golf courses, and overflow is discharged to Forester Creek.

Monitoring Program. The monitoring program was initiated in 1953 to detect changes in ground water quality which might occur due to waste discharges, reuse of ground water, and importation of Colorado River water. In 1959, 16 samples were collected from 10 monitored wells.

Evaluation of Water Quality. Ground water in the basin is predominantly sodium chloride or sodium-calcium chloride in character. The water is hard

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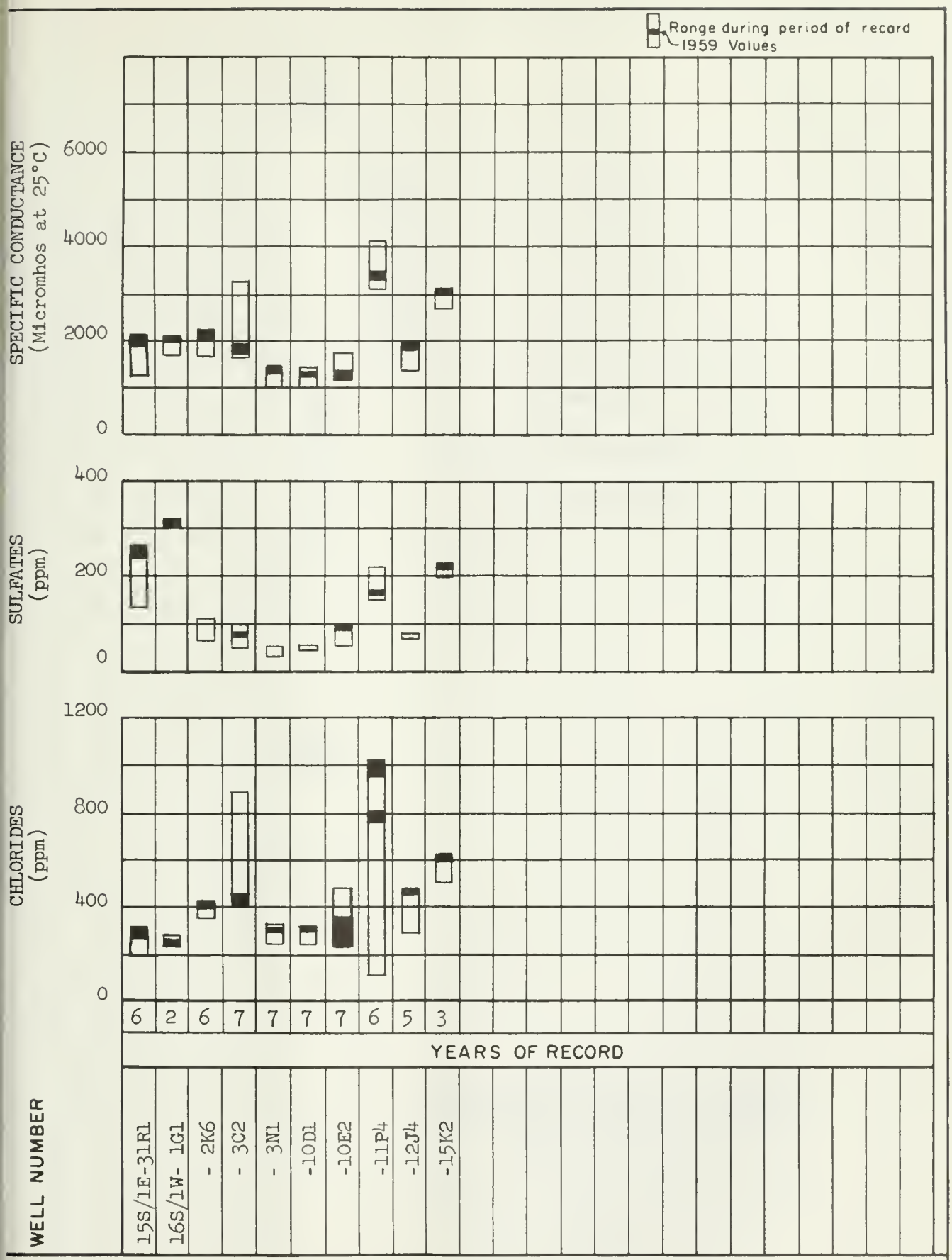
Evaluation of Water Quality. Ground water in the basin is predominantly sodium chloride or sodium-calcium chloride in character. The water is hard

to very hard and high in total dissolved solids, chloride, and nitrate content. Total dissolved solids and chloride content generally exceed the accepted standards for drinking water.

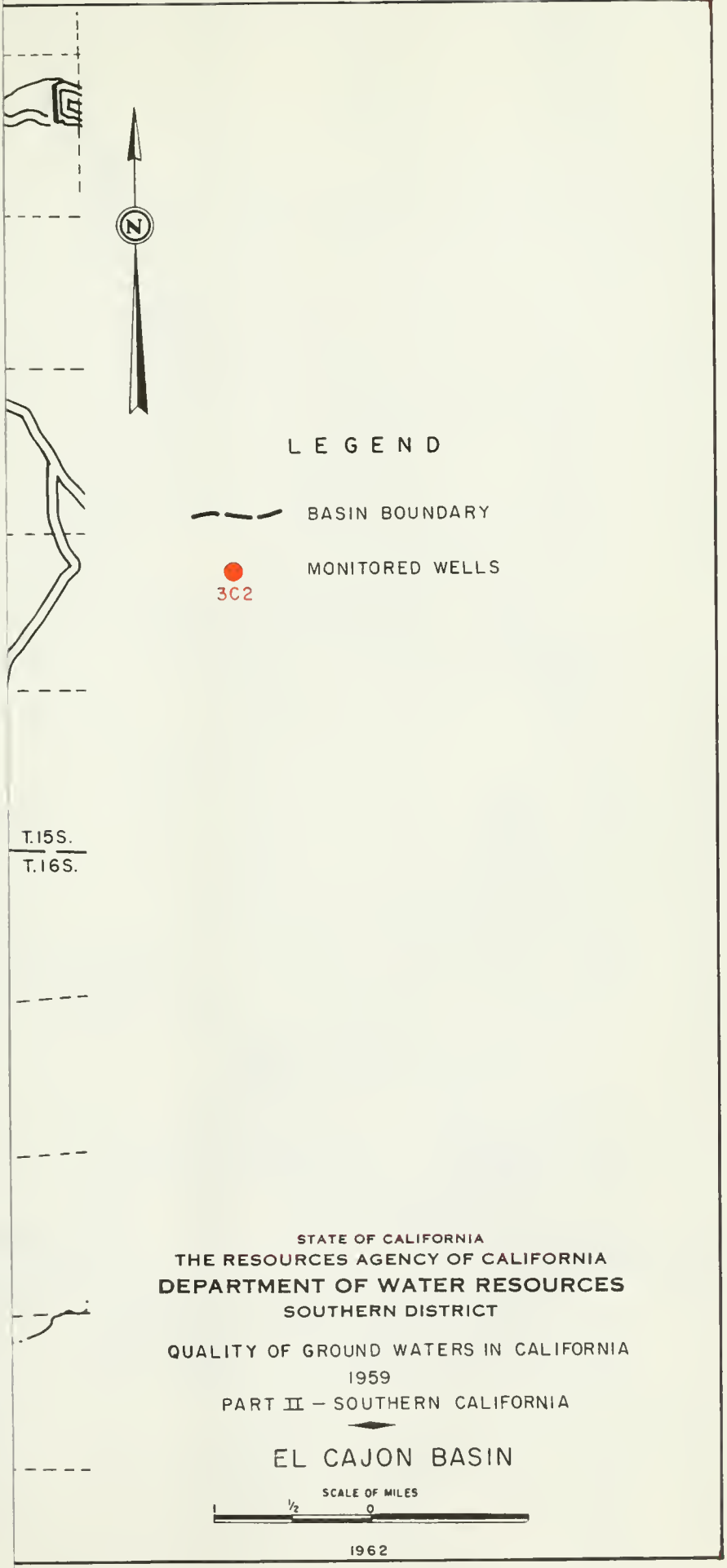
Significant Changes in Water Quality. The quality of ground water is extremely variable. No general increases in mineral concentrations were indicated by the mineral analyses of ground water samples collected in 1959.

Evaluation of analyses for the seven years of record show that average chloride and nitrate content has decreased, but that total dissolved solids and sulfate content have increased. For the period of record, rapid increases in concentration in ground water from individual wells have usually been followed by rapid decreases, and in general follow no consistent pattern of change.



WATER QUALITY RANGES

EL CAJON VALLEY



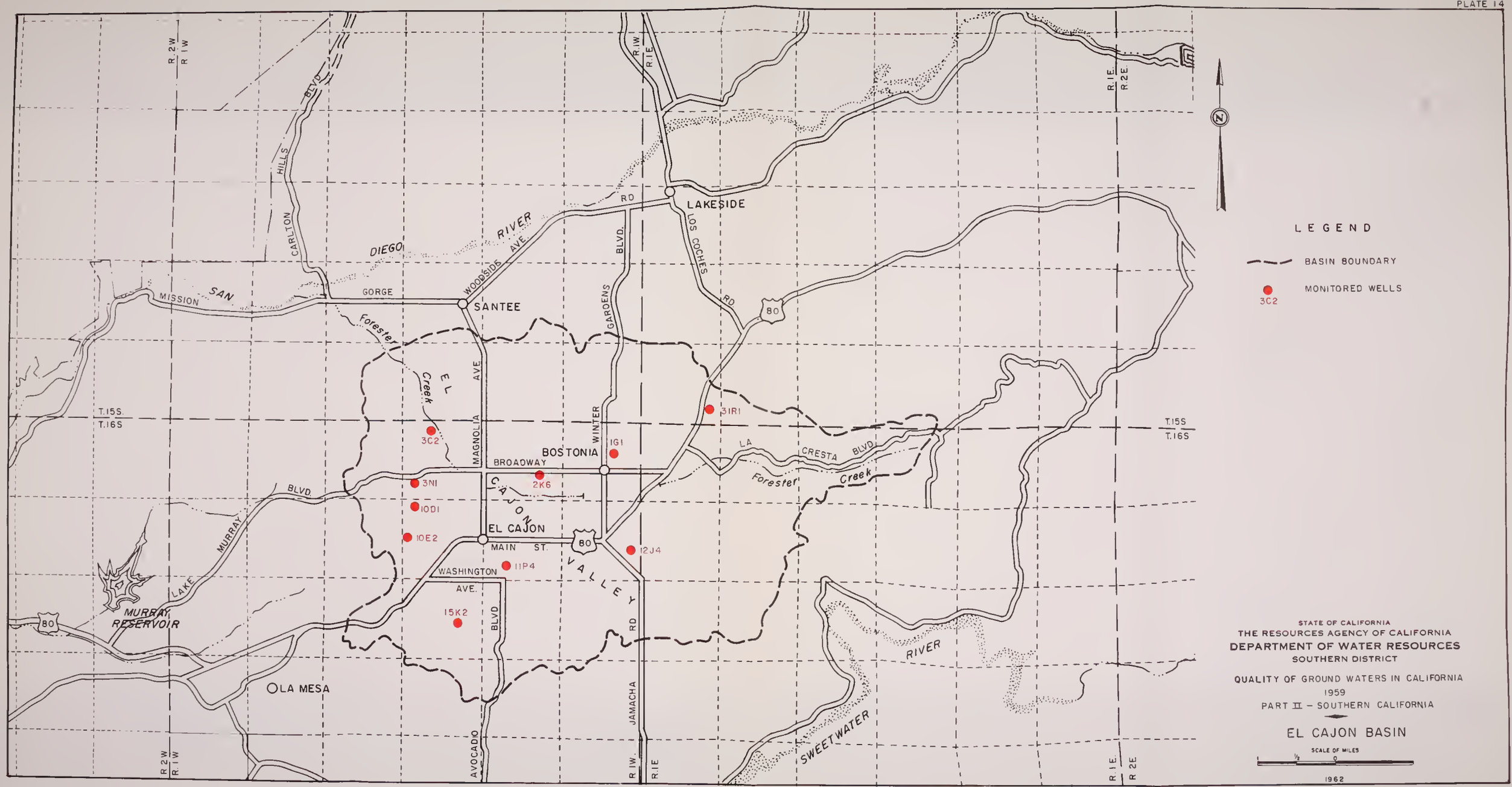
STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II — SOUTHERN CALIFORNIA

EL CAJON BASIN

SCALE OF MILES
1 ½ 0

1962


R 2W
R 1W
R 1E
R 2E
T.15S.
T.16S
HILLS
BLVD.
CARLTON
SAN DIEGO RIVER
MISSION GORGE
WOODSIDE AVE.
RD
LAKESIDE
LOS COCHES RD
80
SANTEE
GARDENS BLVD.
WINTER
MAGNOLIA AVE
Forester Creek
EL
3C2
3IR1
1G1
BOSTONIA
BROADWAY
LA CRESTA BLVD
3N1
2K6
10D1
EL CAJON
MAIN ST.
10E2
12J4
11P4
WASHINGTON AVE.
15K2
MURRAY BLVD
LAKE MURRAY
MURRAY RESERVOIR
OLA MESA
AVOCADO BLVD
JAMACHA RD
SWEETWATER RIVER
N
LEGEND
BASIN BOUNDARY
MONITORED WELLS
3C2
STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT
QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II – SOUTHERN CALIFORNIA
EL CAJON BASIN
SCALE OF MILES
1962

Tia Juana Valley Basin (9-19)

The Tia Juana Valley Basin is located on the California-Mexico boundary. It extends from the ocean in San Diego County inland along the Tia Juana River into Mexico. In California the basin is about five miles in length, averages 1.5 miles in width, and has an area of about seven square miles; boundaries are shown on Plate 15, "Tia Juana Basin."

Ground Water Occurrence. Ground water is found in the alluvium which underlies the Tia Juana River channel. Hydrologic observations indicate the presence of a shallow water-bearing zone overlying a deeper zone in most of the monitored area near the ocean. Both zones are composed of alluvial sediments, but the low permeability of the upper zone gives the lower zone the characteristics of a pressure aquifer. Only one zone exists in the inland portion of the monitored area. Well yields range from 60 to 1,500 gallons per minute.

Ground Water Development and Use. Ground water is extensively developed for irrigation. Lesser amounts are used for municipal and domestic needs. Ground water supplies all uses in the basin.

Storage of ground water is highly responsive to recharge conditions and use. In periods of low rainfall, use of water lowers ground water levels to below sea level and induces intrusion of sea water.

Major Waste Discharges. The major waste discharge is sewage from the City of San Ysidro. After processing at the City's sewage treatment plant, it was conveyed to the ocean by pipeline in 1959. Irrigation waste water readily percolates to the ground water body.

Monitoring Program. The monitored area is the portion of the basin within California. It was included in the monitoring program in 1953 to follow the advance of salt water intrusion noticed in coastal wells in 1947. In 1959, 19 samples were collected from 11 monitoring wells.

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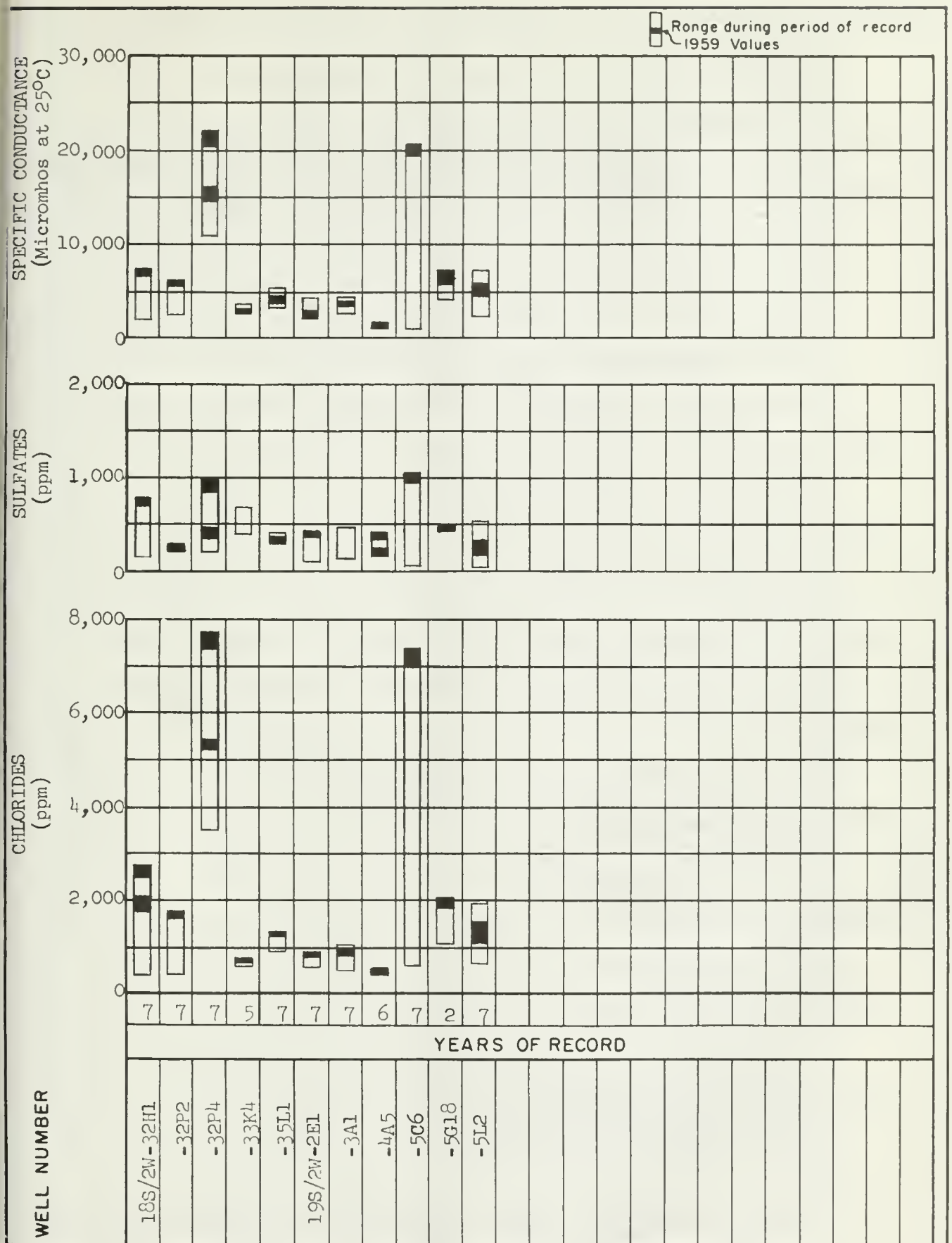
Evaluation of Water Quality. Ground water is sodium chloride in character, and although poor in mineral quality, is used successfully for agricultural and domestic purposes. Degrading influences are attributed to sea-water intrusion, adverse salt balance, and inflow of connate water from older sediments.

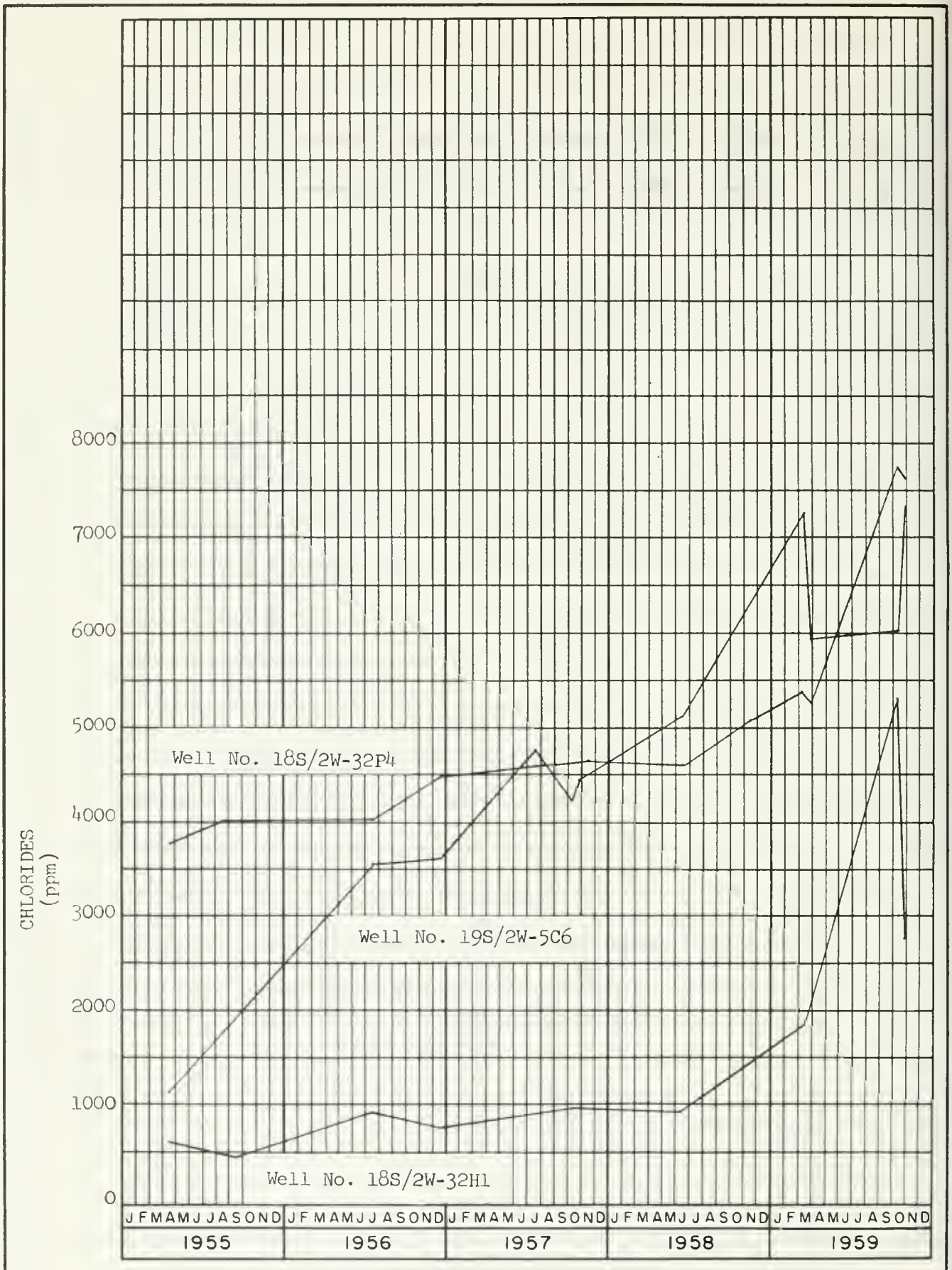
Significant Changes in Ground Water Quality. Comparison of analyses of grou water samples collected in 1959 with those of 1958 shows a general increase in total dissolved solids and chloride throughout the basin. Ground water from well 18S/2W-32P4, located about one mile inland from the coast, showed a chloride increase from 4,600 ppm in June 1958 to 7,605 ppm in October 1959. Ground water from well 18S/2W-32H1, about a mile and one-half from the coast, showed an increase in chloride from 875 ppm in June 1958 to 2,730 ppm in October 1959, indicating sea-water intrusion to a distance of more than one and one-half miles inland.

Ground water from wells 19S/2W-2E1 and -3A1, about 3.5 miles from the ocean, showed chloride contents of 791 ppm and 964 ppm, respectively, in 1959. The high chlorides in these well waters is believed to be due to re-use of ground water, migration of poor quality water from adjacent marine sediments, or both.



WATER QUALITY RANGES

TIA JUANA VALLEY BASIN



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

TIA JUANA VALLEY BASIN

LEGEND

BASIN BOUNDARY

2E1 MONITORED WELL

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
EPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

UALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II — SOUTHERN CALIFORNIA

TIA JUANA BASIN

SCALE OF MILES
1 ½ 0 1

1962

LEGEND

BASIN BOUNDARY

MONITORED WELL

2E1

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

QUALITY OF GROUND WATERS IN CALIFORNIA
1959
PART II — SOUTHERN CALIFORNIA

TIA JUANA BASIN

SCALE OF MILES
½ 0 1

1962

APPENDIX A

PROCEDURES AND CRITERIA

Laboratory Methods and Procedures

Analytical methods used in the determination of the various constituents in the following tables conform generally to those presented in "Standard Methods for the Examination of Water, Sewage, and Industrial Wastes," a joint publication of the American Public Health Association, American Water Works Association, and the Federation of Sewage and Industrial Wastes Association, 10th edition, 1955. Analytic procedures described in "Methods of Water Analyses," United States Geological Survey, 1956, now in preparation for publication, have been used for the determination of certain specific constituents.

Table A-1 indicates the constituents analyzed for in the various types of analyses performed in connection with this program.

Mineral analyses of the water samples were performed by the Department of Water Resources laboratories located in San Bernardino and Riverside, by Terminal Testing Laboratories, Incorporated, located in Los Angeles, or U. S. Agricultural Consultants and Laboratories, located in Burbank. Cooperating agencies which collected samples and analyzed them in their laboratories were Los Angeles County Flood Control District, San Bernardino County Flood Control District, Orange County Department of Agriculture, and the Bureau of Sanitary Engineering Laboratory and The Metropolitan Water District of Southern California, located in Los Angeles. The laboratory which conducted and reported each mineral analysis is indicated in the right hand column of the Mineral Analyses Tables. Radioactivity counting was performed by Isotopes Specialities Company, Incorporated, located in Burbank, Petroleum Engineering Associates

TABLE A-1

Types of Analysis

Constituent	Standard mineral	Partial mineral	Radiological
Specific Conductance	X	X	
pH[a]	X	X	
Total dissolved solids	X		
Percent Sodium	X	X	
Temperature[a]	X	X	
Calcium	X		
Magnesium	X		
Sodium	X		
Potassium	X		
Carbonate	X	X	
Bicarbonate	X	X	
Sulfate	X		
Chloride	X	X	
Nitrate	X		
Fluoride	X		
Boron	X		
Silica	X		
Total Activity[b]			X

a. Field determination.
b. Total activity determination is the total alpha, beta, and gamma activity.

Laboratory located in Long Beach, Terminal Testing Laboratories, Incorporated, located in Los Angeles, or the California Disaster Office Laboratory, located in Sacramento.

The methods and procedures for sample preparation and determination of radioactivity in ground water were those currently recommended by the United States Public Health Service's Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. For uniformity of presentation of the results, they have been computed to the common basis of total radioactivity calculated as alpha plus beta plus gamma activity, less background activity. The statistical errors have been converted to one standard deviation, in

micro-micro curies (2.22 counts per minute) per liter of water. The final result is expressed (symbolically) as x±y uuc/l. This means that in a series of determinations on the same sample, the value of x should fall between x-y and x+y.

Water Quality Criteria

Criteria used by the Department of Water Resources in the evaluation of the acceptability of water for the most common beneficial uses are described hereinafter. In general, the values presented herein should be considered only as guides to judgment, and not as absolute limiting standards.

Criteria for Drinking Water

Chapter 7 of the California Health and Safety Code contains laws and standards relating to domestic water supply. Section 4010.5 of this code refers to the drinking water standards promulgated by the United States Public Health Service for water used on interstate carriers. These criteria have been adopted by the State of California. They are set forth in detail in United States Public Health Report, Volume 61, No. 11, March 15, 1946, reissued in March 1956.

According to Section 4.2 of the above-named report, chemical substances in drinking water, either natural or treated, should not exceed the concentrations shown in Table A-2.

Interim standards for certain mineral constituents have recently been adopted by the California State Board of Public Health. Based on these standards, temporary permits may be issued for drinking water failing to meet the United States Public Health Service Drinking Water

TABLE A-2

LIMITING CONCENTRATIONS OF MINERAL CONSTITUENTS FOR DRINKING WATER

United States Public Health Service
Drinking Water Standards, 1946

Constituent	Parts per million
Mandatory	
Fluoride (F)	1.5
Lead (Pb)	0.1
Selenium (Se)	0.05
Hexavalent chromium (Cr^{+6})	0.05
Arsenic (As)	0.05
Nonmandatory but Recommended Values	
Iron (Fe) and Manganese (Mn) together	0.3
Magnesium (Mg)	125
Chloride (Cl)	250
Sulfate (SO_4)	250
Copper (Cu)	3.0
Zinc (Zn)	15
Phenolic compounds in terms of phenol	0.001
Total solids - desirable	500
- permitted	1,000

Standards, provided the mineral constituents in the following tabulation are not exceeded.

UPPER LIMITS OF TOTAL SOLIDS AND SELECTED MINERALS IN DRINKING WATER AS DELIVERED TO THE CONSUMER

	Permit	Temporary Permit
Total solids	500 (1,000)*	1,500 ppm
Sulfates (SO_4)	250 (500)*	600 ppm
Chlorides (Cl)	250 (500)*	600 ppm
Magnesium (Mg)	125 (125)*	150 ppm

* Numbers in parentheses are maximum permissible, to be used only where no other more suitable waters are available in sufficient quantity for use in the system.

The California State Board of Health recently has defined the maximum safe amounts of fluoride ion in drinking water in relation to mean annual temperature.

Mean annual temperature in °F	Mean monthly maximum fluoride ion concentration in ppm
50	1.5
60	1.0
70 - above	0.7

The relationship of infant methemoglobinemia (a reduction of oxygen content in the blood, constituting a form of asphyxia) to nitrates in the water supply has led to limitation of nitrates in drinking water. The California State Department of Public Health has recommended a tentative limit of 10 ppm nitrogen (44 ppm nitrates) for domestic waters. Water containing higher concentrations of nitrates may be considered to be of questionable quality for domestic and municipal use.

Limits may be established for other organic mineral substances if their presence in water renders it hazardous, in the judgment of state or local health authorities.

An additional factor with which water users are concerned is hardness. Hardness is due principally to calcium and magnesium salts and is generally evidenced by inability to develop suds when using soap. The United States Geological Survey has suggested that degrees of hardness be classified as shown on Table A-3.

TABLE A-3

Hardness Classification of Waters
U. S. Geological Survey

Range of hardness in parts per million	Relative classification
0 - 55	Soft
56 - 100	Slightly hard
101 - 200	Moderately hard
Greater than 200	Very hard

Criteria for Irrigation Water

Because of the diverse climatological conditions, crops, soils, and irrigation practices in California, criteria which may be set up to evaluate the suitability of water for irrigation use must necessarily be of a general nature, and judgment must be used in their application to individual cases. Suggested limiting values for total dissolved solids, chloride concentration, percent sodium and boron concentration for three general classes of irrigation water are shown in Table A-4.

Criteria for Industrial Water

The water quality criteria for the diversified uses of water in industry range from the exacting requirements for make-up water for high pressure boilers to the minimum requirements for water washdown and metallurgical processing.

Because of the large number of industrial uses of water and widely varied quality requirements, it is practicable to suggest only very broad criteria of quality. These variable conditions make it desirable to consider water quality requirements in broad and general terms only,

and, where possible, for groups of related industries rather than individually. The general quality requirements of several individual and major groups of water uses are listed in Table A-5. The values shown in this table are those suggested in the Progress Report of the Committee on Quality of Tolerance of Water for Industrial Uses in the Journal of the New England Water Works Association, Volume 54, 1940.

TABLE A-4

QUALITATIVE CLASSIFICATION OF IRRIGATION WATERS

Chemical properties	Class 1 Excellent to good (Suitable for most plants under any conditions of soil and climate)	Class 2 Good to injurious (Possible harmful for some crops under certain soil conditions)	Class 3 Injurious to unsatisfactory (Harmful to most crops and unsatisfactory for all but the most tolerant)
Total dissolved solids			
In ppm	Less than 700	700 - 2,000	More than 2,000
In conductance, EC x 10^6	Less than 1,000	1,000 - 3,000	More than 3,000
Chloride ion concentration			
In milliequivalents per liter	Less than 5	5 - 10	More than 10
In ppm	Less than 175	175 - 350	More than 350
Sodium in percent of base constituents	Less than 60	60 - 75	More than 75
Boron in ppm	Less than 0.5	0.5 - 2.0	More than 2.0

TABLE A-5

WATER QUALITY TOLERANCE FOR INDUSTRIAL USES[a]

Allowable limits in parts per million

Use	Turbidity	Color	Hardness as $CaCO_3$	Iron[c] as Fe	Manganese as Mn	Total solids	Alkalinity as $CaCO_3$	Odor, taste	Hydrogen sulfide	Miscellaneous Requirements	
										Health	Other
Air conditioning				0.5	0.5			Low	1		No corrosiveness, slime formation
Baking	10	10		0.2	0.2			Low	0.2	Potable[b]	
Brewing											
Light Beer	10			0.1	0.1	500	75	Low	0.2	Potable[b]	NaCl less than 275 ppm (pH 6.5-7.0).
Dark Beer	10			0.1	0.1	1,000	150	Low	0.2	Potable[b]	NaCl less than 275 ppm (pH 7.0 or more)
Canning											
Legumes	10		25-75	0.2	0.2			Low	1	Potable[b]	
General	10			0.2	0.2			Low	1	Potable[b]	
Carbonated beverages	2	10	250	0.2	0.2	850	50-100	Low	0.2	Potable[b]	Organic color plus oxygen consumed less than 10 ppm.
Confectionery				0.2	0.2	100		Low	0.2	Potable[b]	pH above 7.0 for hard candy.
Cooling	50		50	0.5	0.5				5		No corrosiveness, slime formation.
Food: General	10			0.2	0.2			Low		Potable[b]	
Ice	5	5		0.2	0.2			Low		Potable[b]	SiO_2 less than 10 ppm.
Laundering			50	0.2	0.2						
Plastics, clear,											
Uncolored	2	2		0.02	0.02	200					
Paper and pulp:											
Groundwood	50	20	180	1.0	0.5						No grit, corrosiveness.
Draft pulp	25	15	100	0.2	0.1	300					
Soda and sulfide	15	10	100	0.1	0.05	200					
High-grade light papers	5	5	50	0.1	0.05	200					
Rayon (viscose):											
Pulp production	5	5	8	0.05	0.03	100	total 50; hydroxide 8				Al_2O_3 less than 8 ppm, SiO_2 less than 25 ppm, Cu less than 5 ppm.
Manufacture	0.3		55	0.0	0.0						pH 7.8 to 8.3
Tanning	20	10-100	50-135	0.2	0.2		total 135; hydroxide 8				
Textiles: General	5	20		0.25	0.25						
Dyeing	5	5-20		0.25	0.25	200					Constant composition. Residual alumina less than 0.5 ppm.
Wool scouring		70		1.0	1.0						
Cotton bandage	5	5		0.2	0.2			Low			

a-Moore, E. W., Progress Report of the Committee on Quality Tolerances of Water for Industrial Uses: Journal New England Water Works Association, Volume 54, Page 271, 1940.
b-Potable water, conforming to U. S. P.H.S. standards, is necessary.
c-Limit given applies to both iron alone and the sum of iron and manganese.

APPENDIX B

WELL DATA, ANALYSES OF GROUND WATER

AND

RADIOASSAY OF GROUND WATER, 1959

WELL DATA
1959

WELL DATA

1959

State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		SANTA MARIA RIVER VALLEY (3-12)									
9N/32W-17G1	0.55 mile west of Tepusquet Creek Road 800 feet north of Foxen Canyon Road	E. C. Lyman	1929	Dom.	447	6	107		Yes	Yes	Yes
9N/33W-2A1	400 feet north of Wicks Avenue 40 feet west of Andrew Avenue	J. S. Calderon et al	1921	Irr.	381	12	168	34-48	Yes	Yes	Yes
9N/33W-8K1	1.35 miles east of Highway 101 0.5 mile north of Clark Avenue	Lake Marie Farms		Dom.		6	543		Yes		Yes
9N/33W-9A1	700 feet south of Orcutt-Garey Road 500 feet west of Dominion Road	W. E. Houke Estate		Dom.	556	10	220		Yes	Yes	Yes
9N/33W-12R1	530 feet west of Palmer Road 250 feet south of Depot Avenue	Sisquoc School	12-1950	Dom.		8	312	201-209, 214-222 229-251, 256-286	Yes		Yes
9N/34W-9E1	1.0 mile west of Blosser Road 50 feet south of Highway 1	Mattia Boghuda		Irr.		14	377				Yes
10N/34W-3P2	0.25 mile north of Donovan Road 50 feet west of Railroad Avenue	C. J. Donovan	7-1957	Irr.		16	308	148-188	Yes		Yes
10N/34W-6N1	0.6 mile north of Bonita Lateral Road 0.45 mile east of Bonita School Road	Grisingher and Signorelli	5-1924	Irr.	153	16	190	50-79, 82-100 117-130, 135-189	Yes	Yes	Yes
10N/34W-16R1	0.15 mile north of Stowell Road 40 feet west of Blosser Road	Jerry Mahoney		Irr. Dom.	205	16	200	99-104	Yes	Yes	Yes
10N/34W-19R1	50 feet north of Santa Maria Valley Railroad, 50 feet west of Black Road	E. H. Moore	1928	Irr.	164	16	262	120-135, 241-260	Yes		Yes
10N/34W-21R1	0.35 mile north of Betteravia Road 50 feet west of Blosser Road	Dustin Hobbs		Irr. Dom.	203	16	197	100-140, 149-189	Yes	Yes	Yes
10N/34W-26R2	75 feet west of Bradley Road 50 feet south of Prell Road	Bradley Land Co.		Irr.	258	14	452	142-155, 170-180 190-218		Yes	Yes
10N/35W-4C1	0.6 mile south of Nipomo Mesa Road 50 feet west of Highway 1.	Union Sugar Co.	11-1928	Irr.	88	16	280	140-217	Yes	Yes	Yes
10N/35W-5J1	0.45 mile west of Highway 1 0.45 mile south of Guadalupe Oil Field Road	Union Sugar Co.	2-1925	Dom. Irr. Stk.	80	16	291	137-144, 176-188 225-230, 250-280	Yes	Yes	Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)

b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA
1959

State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		SANTA MARIA RIVER VALLEY (3-12) (Continued)									
10N/35W-9F1	0.4 mile north of West Main Street 0.1 mile east of Obispo Street	Waller Flower Seed Company		Irr.	89	12	198	110-119, 152-195	Yes	Yes	Yes
10N/35W-16M1	0.9 mile south of West Main Street 50 feet west of Highway 1	Agnes F. King		Dom. Irr.	78	12	224		Yes		Yes
10N/35W-17D1	1.0 mile west of Highway 1 0.3 mile south of West Main Street	Union Sugar Co.	4-1938	Irr.	64	16	250	100-128, 181-185 199-216, 228-243	Yes	Yes	Yes
10N/35W-21C1	0.5 mile north of Brown Road 50 feet west of Highway 1	Agnes F. King		Irr.	93	12			Yes	Yes	Yes
10N/36W-12R1	2.7 miles west of Highway 1 0.3 mile south of West Main Street	Avilina Morgante	11-1930	Irr.	33	12	214	177-220	Yes		Yes
11N/34W-19Q1	2.8 miles southwest of Nipomo 30 feet west of Nipomo Mesa Road	Frank Silva		Dom. Irr.	305	6	241		Yes	Yes	Yes
11N/34W-29P2	1.75 miles east of Bonita School Road 0.3 mile north of Old Jettey	Alfred Guerra	8-1941	Irr.		16	201		Yes		Yes
11N/35W-18M1	3.0 miles west of Highway 1 0.3 mile north of Oso Flaco Road	Union Sugar Co.		Dom.	24	6	200				Yes
11N/35W-19E2	2.5 miles west of Highway 1 0.3 mile south of Oso Flaco Road	Mary B. Enos	6-1951	Irr.		16	518	76-518	Yes		Yes
11N/35W-26M1	0.5 mile west of Nipomo Mesa Road 50 feet north of Oso Flaco Road	Punnels	1946	Irr.	106	16	477		Yes		Yes
11N/35W-28B1	80 feet north of Oso Flaco Road 50 feet west of Highway 1	Pat Mahoney	1924	Irr.	70	12	465		Yes		Yes
11N/35W-33F1	300 feet north of Nipomo Mesa Road 50 feet west of Highway 1	Union Sugar Co.	7-1932	Irr.	84	16	234	118-150, 154-170 174-208	Yes	Yes	Yes
11N/36W-13R1	3.1 miles west of Highway 1 0.2 mile south of Oso Flaco Road	Mary B. Enos		Dom.	15	16					Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA

1959

State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		CUYAMA VALLEY (3-13)									
9N/24W-19F1	400 feet west of U. S. Highway 399 near Cuyama Forest Range	U. S. Government Forest Service		Dom.							
10N/25W-22E1	North side of State Highway 166 and 2.7 miles east of Cuyama River Bridge	E. H. Mettler & Sons		Dom.	2368	16-10	659	108-402; 408-655	Yes	Yes	Yes
10N/25W-23E1	On north side of State Highway 166 and 4.0 miles east of Cuyama River Bridge	E. H. Mettler & Sons		Dom. Irr.	2397	16-12-10	810	175-810	Yes	No	Yes
10N/25W-30F1	0.8 mile south of State Highway 166 at Cuyama School on east side of dirt road	Adolf Kirschenmann		Irr.	2320	16	376	124-232; 241-370	Yes	No	Yes
10N/25W-32H1	1.35 miles south of State Highway 166 at Cuyama School, 1.5 miles east on dirt road, then 0.25 mile south near reservoir	Pam Barkley	1950	Irr.	2410	16	400		No	Yes	Yes
10N/26W-4R1	2.9 miles north of State Highway 166 and 2.0 miles southeast of Cuyama Post Office	Herbert Russell		Dom. Irr.	2110					Yes	Yes
10N/26W-14C1	1.45 miles NNW of Cuyama Post Office and about 1 mile north of Highway 166	Cuyama Ranch		Stk				Spring			
10N/26W-14C2	" " " " " " " "	Cuyama Ranch						"			
10N/26W-14C3	" " " " " " " "	Cuyama Ranch						"			
10N/26W-14C4	1.8 mile east of Cuyama Ranch Heights and 1.48 miles north-northwest of Cuyama Post Office	H. Russell	1949	Irr. Stk.	2175	10	110	36-110	Yes		Yes
10N/26W-21Q2	2.5 miles west southwest of Cuyama Post Office	Stanley Germain		Dom. Irr.							Yes
10N/26W-23P1	0.7 mile south of State Highway 166 and 0.5 mile west of Cuyama	Goehring Bros.		Dom. Irr.	2280	16		82-268; 274-400	Yes	Yes	Yes
10N/27W-11C1	0.9 mile southeast of Cuyama Highway Maintenance Station along State Highway 166 and 0.25 mile north, by reservoir	W. Smith		Dom. Irr.	1963	14	378	36-117	Yes	Yes	Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA
1959

State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		OXNARD PLAIN BASIN (4-4.01)									
1N/21W-30A1 11-W-17	0.33 mile west of Highway 101 along Hueneme Road and 200 feet south of Hueneme Road.	Ed Murdhardt	4-1931	Dom. Irr.			591	387-407, 421-434, 498-512, 532-587	No	No	Yes
1N/21W-31L1 Navy #3	100 feet south of East-West Casper Road; 1.25 mile east of North-South Casper Road.	U.S. Naval Air Station		Mil.		10	1000		Yes		Yes
1N/22W-3F4 9-U-9	200 feet east of Saviers Road and 100 feet north of Third Street.	City of Oxnard	1912	Mun.			232		Yes	Yes	Yes
1N/22W-7D1 7-U-2	0.80 mile west of West Road and 100 feet south of Wooley Road.	D. McGrath Estate		Dom. Stk.	13					Yes	Yes
1N/22W-9Q3	1400 feet south of Howe Road extended east, 1350 feet east of Ventura Road.	Ignatius Friedrich		Dom. Irr.			154				Yes
1N/22W-15B3 #7	130 feet north of Dempsey Road and 150 feet west of Ventura R.R., along Dempsey Road.	City of Oxnard	3-1954	Mun.	38	16	240	137-155, 175-195, 206-217	Yes	Yes	Yes
1N/22W-18E1 8-V-12	0.36 mile south of Oxnard Road and 75 feet east of Ocean Drive.	Hollywood Beach Resort		Dom.		12	218	196-210	No	No	Yes
1N/22W-20B1 NCBC#4	0.5 mile south of Cutting Road and 500 feet east of Patterson Road.	U. S. Navy	1914	Dom.			324	268-305	No	No	Yes
1N/22W-20E2 8-V-27	15 feet south of Highland Drive, 80 feet west of south end of Panama Drive.	Silver Strand Mutual Water Company	3-1955	Mun.			1014	940-974	Yes		Yes
1N/22W-20R1 8-V-21	0.5 mile west of Ventura Road and 0.34 mile south of Pleasant Valley Road.	U. S. Navy		Obs.	12	12				Yes	Yes
1N/22W-23C1 10-V-13	0.3 mile southwest of Pleasant Valley Road from Etting Road, 100 feet southeast of Pleasant Valley Road.	K. L. Varnau	1938	Dom. Irr.	26	4	230			Yes	Yes
1N/22W-26A1 10-W-10	20 feet south of Hueneme Road; 500 feet west of Casper Road.	S. R. Pidduck	5-1924	Irr.		12	236	188-229	Yes	Yes	Yes
1N/22W-28A2 9-V-41	0.32 mile west of Saviers Road and 20 feet south of Hueneme Road.	R. E. Lown	1949	Irr. Dom.		14			No	No	Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA

1959

State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		OXNARD PLAIN BASIN (4-4.01) (Continued)									
1N/22W-28H2 9-W-18	50 feet east of Perkins Road and 1750 feet south of Hueneme Road.	Kalof Pulp and Paper Company	7-1-52	Dom. Ind.		10	175	135-170	Yes		Yes
1N/22W-36K1 10-W-21	1.6 mi. S/o Hueneme along Casper Road to turn in Casper Road and 0.65 mi. E along Casper Road and 200' S/o Casper Road.	Ventura County Game Preserve	10-9-46	Dom. Irr.		12	186	150-168			Yes
1N/22W-36K3	0.25 miles south of East-West Casper Road, 0.45 miles east of North-South Casper Road Produced.	Ventura County Game Preserve	11-28-45	Ponds		14	335	155-170, 189-210			Yes
2N/22W-27M2 9-T-27	200 feet west of Highway 101 Alt. and 0.1 mile south of Vineyard Avenue.	Oasis Motel	8-18-47	Dom.		12	225	180-210			Yes
2N/23W-25Q1 7-T-5	2.9 miles west of Ventura Road and 0.15 miles north of Gonzales Road (3.95 miles west of Highway 101).	Frank McGrath Estate	5-28-47	Dom.	20	10	232	190-220	Yes	Yes	Yes

WELL DATA
1959

State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		WEST COAST BASIN (4-11.02) SANTA MONICA BAY AREA									
2S/15W-34K1	East of Playa Del Rey; 140 feet southwest of Pershing Drive, 80 feet northwest of Moscow Street	Los Angeles Department of Water and Power	9-24	Obs.	82.2	16	208		Yes	Yes	Yes
3S/14W-7K2 1317A	El Segundo, 60 feet west of Duley Road and 2,145 feet north of El Segundo Blvd.	Standard Oil Co.	1949	Ind.	97.0	16	500			Yes	Yes
3S/14W-29M1 722C	65 feet north of Vorhees Ave. and 100 feet west of Blossom Lane, Manhattan Beach	California Water Service Co.	7-37	Mun.	114.2	16	474	210-223, 346-360	Yes	Yes	Yes
3S/14W-30D1 701F	300 feet east of Sepulveda Blvd. and 145 feet north of 8th Street, Manhattan Beach	City of Manhattan Beach		Obs.	154.0	16	350		Yes	Yes	Yes
3S/14W-30G1 711C	200 feet east of Redondo Avenue, 75 feet north of 5th Street	City of Manhattan Beach	1949	Mun.	128.4		500			Yes	Yes
3S/14W-30H2 721K	50 feet west of Aviation Blvd., 50 feet south of 6th Avenue	City of Manhattan Beach	2-49	Mun.	126.0		600			Yes	Yes
3S/14W-31A3 712B	East of Hermosa Beach, 80 feet east of Pier Avenue and 450 feet south of Redondo Beach Blvd.	California Water Service Co.	1908	Obs.	92.3	14	288		Yes	Yes	Yes
3S/14W-32F1	145 feet west of Ridge Lane, 40 feet north of Harriman Lane, Redondo Beach	Alvin A. Selleck	before 1930	Not used	148.1	10	551			Yes	Yes
3S/15W-3A1	0.8 mile northwest of Imperial Highway, 0.3 mile southwest of intersection Century Blvd. and Pershin Drive, in Playa Del Rey	Los Angeles County Flood Control District	12-51	Test	70.0		309		Yes	Yes	Yes
3S/15W-11M5	Southeast corner of I and 11th Streets Hyperion Sewage Plant, El Segundo	Los Angeles County Flood Control District	6-10-55	Obs.	30.0	8	150		Yes	Yes	Yes
3S/15W-11Q1 1288F	14 feet north of center line of El Segundo Blvd., 40 feet west of center line of Whiting Street, El Segundo	Los Angeles County Flood Control District	12-21-56	Obs.	106.2	8	300		Yes	Yes	Yes
3S/15W-12G1 1297E	55 feet west of California Street, 60 feet south of Palm Avenue	City of El Segundo	6-30-39	Mun.	112.6	16	349	139-154; 205-221 292-332	Yes	Yes	Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA

1959

State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		WEST COAST BASIN (4-11.02) SANTA MONICA BAY AREA (Continued)									
3S/15W-12H2 1307E	50 feet north of Palm Avenue and 150 feet east of Washington Street	City of El Segundo		Mun.	135	16	350	202-229	Yes	Yes	Yes
3S/15W-12H3 1307D	250 feet north of Palm Avenue and 600 feet west of Sepulveda Blvd.	City of El Segundo	3-21-47	Mun.					No	No	Yes
3S/15W-13R6 1307D	755 feet west of Sepulveda Blvd. and 80 feet north of Rosecrans Avenue	Standard Oil Co.		Ind.		16	495	276-325; 380-392	Yes	Yes	Yes
3S/15W-25A3 1309M	250 feet west of Sepulveda Blvd., 100 feet north of 8th Street, north side of plant	City of Manhattan Beach	6-36	Mun.	156.0	16	350		Yes	Yes	Yes
4S/14W-17F1 737C	1391 feet east of center line of Tulita Avenue, 62 feet south of center line of Sepulveda Blvd., 9 feet west of T.H. "17F2"	Los Angeles County Flood Control District	6-20-58	Test	180.5		675	580-590; grout plug 486-496 outside casing	Yes		Yes
4S/14W-17H2	120 feet north of Sepulveda Blvd. and 300 feet west of Valeric Street	Del Amo Estates Co.	April 1947	Obs.	71	30-96 ft 16-456 ft	456	192-456	Yes	Yes	Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA
1959

State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		WEST COAST BASIN HAWTHORNE-GARDENA AREA (4-11.02)									
4S/13W-6Q1 814A	115 feet west of Main Street and 120 feet north of Francisco Street, east of Torrance	George Branning	Prior to 12-1934	Dom. Stock		5	60		No	No	Yes
4S/14W-9Q1 746	750 feet east of Hawthorne Avenue, 950 feet south of Torrance Blvd.	Chanslor - Canfield Midway Oil Co.	10-31-23	Ind.		12	557		No	No	Yes
4S/14W-22Q1 769	0.4 mile west of Pennsylvania Avenue, 100 feet south of Lomita Blvd.	Union Oil Co. of California	11-14-29	Ind.	77	14	660	188-197; 270-300	Yes	Yes	Yes
4S/14W-35E1 271A	1650 feet south of Pacific Coast Highway, 15 feet west of Pennsylvania Avenue	Edward Sidebotham	1-11-26	Ind.	177.7	12	585	280-305; 450-475 482-502	Yes	Yes	Yes
4S/14W-35F2 281C	0.46 mile south of Pacific Coast Highway and 200 feet west of Narbonne Avenue	Chandler's Palos Verdes Sand and Gravel Co.		Ind.		16	695		No	No	Yes
4S/14W-36H1 301	200 feet north of Anaheim Street, 300 feet east of Pacific Electric Railway and west of Wilmington	Palos Verdes Water Co.	7-1923	Mun.	50	26	610	322-610	Yes	Yes	Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA
1959

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
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WELL DATA

1959

State well number and other number	Location	Owner	Date completed	Use[a]	Ground surface elevation[b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		WEST COAST BASIN, TORRANCE AREA (4-11.02)									
3S/13W-29G3 831	125 feet north of 165th Street and 660 feet east of Avalon Blvd.	Maria N. Ishida	1-25-28	Dom. Irr.	61		235		Yes		Yes
3S/13W-31F1 813H	0.34 mile west of Figueroa and 150 feet north of 184th Street	H. E. Distel	1936	Dom.		6					Yes
3S/14W-24K14 800	50 feet south of Compton Blvd. and 30 feet west of Van Buren Avenue Extended	Southern California Water Company		Mun.		16	680	190-220; 570-680	Yes	Yes	Yes
3S/14W-25K4 802	200 feet east of Normandie Avenue and 0.14 mile south of 168th Street	Wilbur Hornstra		Dom. Dairy Irr.		7	180		Yes		Yes
3S/14W-27C1 761	220 feet south of Manhattan Beach Blvd and 320 feet west of bridge over Nigger Slough, 780 feet west of center line of Cerise Avenue	Los Angeles County Park Department	7- 7-37	Irr.		14	448				Yes
3S/14W-35M5 773K	0.3 mile west of Arlington Ave. and 65 feet south of 182nd Street	Moneta Water Co.		Mun.		16 14	435		Yes		Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA

1959

State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing, in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		CENTRAL BASIN PRESSURE AREA (4-11.03)									
3S/13W-2B1 1495B	35 feet north of Michigan Avenue and 100 feet west of Elizabeth Avenue	City of Southgate		Mun.		12	732		No	No	Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)

b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA
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State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		LOS ANGELES FOREBAY AREA (4-11.04)									
2S/13W-10P4 2769G	370 feet west of Santa Fe Avenue and 590 feet north of Vernon Avenue, Vernon	City of Vernon		Mun.		18	1330		No	No	Yes
2S/13W-14H1 1490E	40 feet west of Downey Road and 40 feet north of Fruitland Avenue, Vernon	City of Vernon	1942	Mun.		18	1300		No	No	Yes
2S/13W-15N3 1460D	200 feet east of Alameda Street and 40 feet north of 57th Street, Vernon	Pioneer Paper Co.		Ind.		16	531		No	No	Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)

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WELL DATA
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									Log	Water levels	Analyses
		MAIN SAN GABRIEL BASIN (4-13.01)									
1S/10W- 7A1 4239A	400 feet south of Bonita Avenue and 50 feet west of north of Main Avenue.	Baldwin Park County Water District		Dom. Irr.		16	526		No	No	Yes
1S/10W-10C1 4289	0.88 mile east of Irwindale Avenue and 350 feet south of Bonita Avenue (Arrow Highway), south of Azusa.	City of Glendora		Mun. Irr.	471	26	411		Yes	No	Yes
1S/10W-19N1 3023M	0.25 mile southwesterly along Virginia Avenue from intersection with Garvey Avenue and 0.05 mile southeast, southeast of El Monte.	Walnut Place Mutual Water Company	10-14-50	Dom. Irr.		12	150	100-136; 140-148	No	No	Yes
1S/11W-10F1	850 feet east of Tyler Avenue at end of Farna Street.	Southern California Water Company	4-27-51	Mun.		18	540		Yes	No	Yes
1S/11W-26K1	Well in line with east end of Valley Boulevard Bridge over San Gabriel River, 0.1 mile north of Valley Boulevard.	San Gabriel Valley Water Company	5-25-51	Mun. Ind.			312		No	No	Yes
1S/11W-32C1	0.3 mile south and 0.03 mile west of intersection of Rush Street with Potrero Avenue.	Pedro Mireles		Dom. Irr.		10	102	73-97	No	No	Yes
1S/11W-33P1 29560	55 feet south of Durfee Road and 0.46 mile southwest of Slack Avenue, south of El Monte.	Ed Allvis		Dom. Irr.	230	7	50	40-46	Yes	No	Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

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State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		LOWER MOJAVE RIVER VALLEY (6-40) BARSTOW TO YERMO									
9N/1E-1M1	0.2 mile west of railroad station, 0.1 mile south of Highway 91, Yermo.	Union Pacific Railroad		Mun. Ind.					Yes	Yes	Yes
9N/1E-14M1	1.9 miles east of Daggett and 0.8 mile north of Santa Fe Railroad Station.	California Electric Power Company		Irr.							Yes
9N/1E-15N2	1 mile northeast of Daggett, 2000 feet north of Santa Fe Railroad and 1500 feet east of Union Pacific Railroad.	Grey Phelps		Dom. Irr.					Yes		Yes
9N/2E-8N2	2.3 miles north of Highway 66, 0.8 mile up dirt road from pole line road.	Stuart C. Slack	1948	Dom. Irr.		14	300				Yes
9N/1W-5J2	0.4 mile north of Highway 66 and Riverside Drive intersection, 200 feet east of Riverside Drive on river bank.	Southern California Water Company	12-30-52	Mun.		8	208	7-208	Yes		Yes
9N/1W-5J3	0.4 mile north of intersection of Highway 66 and Riverside Drive, 330 feet east of Riverside Drive.	Southern California Water Company	4-18-56	Mun.		8	222	70-222	Yes		Yes
9N/1W-9G1	2.3 miles east of Barstow, 200 feet north of Highway 66, west of Food Town Market, 0.75 mile east of Riverside Drive.	J. B. Price	6-18-50	Dom.		8	62		No	No	Yes
9N/1W-10D2	4 miles northeast of Barstow, 1.5 mile south of U. S. Highway 91 on Soap Mine Road.	EBCO; Consumer's Oil Co.	Sept. 1944	Dom. Irr. Stk.		12	132				Yes
9N/1W-10G1	0.5 mile south of Soap Mine Road, 0.25 mile east of Mark's Road, 150 feet south of entrance dirt road.	Lee Tippet	1949	Dom.			30				Yes
9N/1W-13H2	0.5 mile below Barstow Marine Base Lagoon, receiver sumphead of Van Dyke ditch.	Cool Water Ranch		Irr.							Yes
9N/2W-1F1	0.8 mile west of Barstow at north end of Bradshaw Street, 7 feet north of A.T. & S.F. Railroad tracks.	Southern California Water Company	4-1947	Mun.		14	174				Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)

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WELL DATA
1959

State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		LOWER MOJAVE RIVER VALLEY (6-40) (Continued) BARSTOW TO YERMO									
10N/1W-32J1	0.6 mile west of Soapmine Road and 0.3 mile south of U. S. Highway 91 and U. S. Highway 466 Junction.	R. W. Dickerson	1950	Dom. Irr.		6	57		No	No	Yes
10N/2E-31R1	200 feet north of U.S. Highway 91 at Inspection Station, 1 mile east of Yermo.	State Department of Agriculture	1930	Dom.		10					Yes

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b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA
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									Log	Water levels	Analyses
		COACHELLA VALLEY (7-21) SOUTH END									
5S/7E-16K1	2.65 miles northwest of Indio, 0.5 mile south of Highway 99, 300 feet west of irrigation canal.	Lester Roberson	10-31-51	Dom.		6	225	169-225	Yes	No	Yes
5S/7E-22K1	1.5 miles west of Indio, 1.3 miles west of Jackson Avenue and Highway 99 intersection, and 240 feet south of intersection.	Z. E. Zalay	8-30-50	Dom.		6	200	144-200	Yes	No	Yes
5S/7E-33C1	2.5 miles west of Indio, 0.27 mile south and 5.01 miles west of intersection of Madison Avenue and Avenue 48.	Joe N. Ramirez & Sons		Dom. Irr.		10	339	144-338	Yes	No	Yes
5S/8E-31D1	0.15 mile south and 0.01 mile east of Van Buren Avenue and Highway 60.	Mitchell Land and Improvement Co.	8-12-50	Dom.		6	300	156-300	Yes	No	Yes
5S/8E-33N1	3 miles southeast of Indio, 1.1 mile east of Highway 111 and 264 feet north of Avenue 50.	E. M. Holm	3-19-51	Dom.		6	148	108-148	Yes	No	Yes
6S/7E-25E1	0.27 mile south and 0.5 mile east of Jackson Avenue and Avenue 58 intersection.	Gifford Phillips	2-14-51	Dom.		8	300	138-178; 242-300	Yes	No	Yes
6S/8E- 7P1	0.4 mile east of Van Buren Avenue and 160 feet north of Avenue 54.	M. R. Shepard	7- 7-50	Dom.		6	150	130-150	Yes	No	Yes
6S/8E-10A3	2.25 miles east of Highway 111, 500 feet south of Avenue 52, 100 feet west of Fillmore Avenue.	E. H. McCain		Dom. Irr.		6	480				Yes
6S/8E-27H1	0.7 mile north and 0.99 mile east of intersection of Polk and Avenue 60.	W. C. & Joe E. Stroube	6-26-51	Dom.		6	700	412-552; 640-700	Yes	No	Yes
6S/9E-30C1	0.5 mile east and 0.01 mile south of intersection of Buchanon Street and 58th Avenue.	Nazenig Karahadian Ranch	7-21-50	Dom. Irr.		6	527	300-420	Yes	No	Yes
7S/8E-22M1	0.27 mile north and 0.02 mile east of intersection of Polk Street and Highway 99.	Vessey Brothers	12-15-50	Dom.		6	348	216-348	Yes	No	Yes
7S/9E-16K1	0.74 mile east and 0.01 mile south of intersection of National Avenue and Johnson Street.	C. Charles Crockett	10-20-52	Dom. Irr.		8	685	245-685	Yes	No	Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)

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WELL DATA
1959

State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		ANAHEIM BASIN PRESSURE AREA (8-1.01)									
5S/11W-20Q5	300 feet east of Algonquin Street and 200 feet north of Wintersburg Avenue.	M. Mullens	1948	Dom.		4	120				Yes
5S/11W-21M3 577F	50 feet east of Bolsa Chica Street, 0.39 mile north of Wintersburg Avenue.	C. C. Stedman	1935	Dom. Irr.	18			203-213; 225-228	Yes	No	Yes
5S/11W-21N2	300 feet east of Bolsa Chica Street, 270 feet north of Wintersburg Avenue.	Anderson Mutual Water Co.		Dom.							Yes
5S/11W-25R2	150 feet west of Cannery Street, 0.24 mile north of Talbert Avenue.	Harry C. Fulton	Prior to 1914	Dom.		7	145		No	No	Yes
5S/11W-27H4	500 feet north of Slater Avenue, 125 feet west of Goldenwest Street.	W. S. Tubach	3-10-31	Dom.	6	4	91		Yes		Yes
5S/11W-28H2 579B C-995P C-8	450 feet north of Slater Avenue, 30 feet west of Springdale.	Callens Brothers	1-0-31	Irr.	5			70-82; 306-354	Yes		Yes
5S/11W-28K1	0.33 mile west of Springdale, 45 feet south of Slater Avenue.	Bolsa Land Co.	11-4-30	Duck pond well	8			292-848			Yes
5S/11W-29C1	50 feet north of Los Patos Avenue, 150 feet east of Algonquin Street, easterly of two wells.	Sunset Land and Water Co.		Mun.	62	6	641	333-357; 384-416	Yes	No	Yes
5S/11W-33H1	4450 feet south of Slater Avenue, 2800 feet west of Edwards Street, 50 feet west of a tank setting.	Signal Oil and Gas Co.	July 1940	Ind.		12	368	330-360			Yes
5S/11W-34F3	0.26 mile west of Edwards Street and 0.74 mile north of Garfield between Bolsa 1 and 2A oil wells.	Signal Oil and Gas Co.	4-17-48	Ind.		12	773	464-773			Yes
5S/11W-36B2	0.58 mile east of Huntington Beach Boulevard and 60 feet south of Talbert Avenue.	Joseph J. Courreges	1921	Dom.			138		Yes	No	Yes
5S/11W-36P1	0.4 mile east of Huntington Beach Boulevard and 0.07 mile north of Garfield Avenue.	Ivan Harper	August 1930	Dom. Irr.	57		148		Yes	No	Yes
5S/12W-12C1	0.45 mile southwest along Westminster Avenue from Los Alamitos Boulevard and 750 feet west of Westminster Avenue.	I. W. Hellman Ranch		Dom. Irr. Stk.	13	12	705	417-473	Yes	No	Yes
6S/10W-5C1	20 feet south of Garfield and 0.35 mile east of Wright.	Robert Gisler		Irr.			210				Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA
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a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

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									Log	Water levels	Analyses
		ANAHEIM BASIN PRESSURE AREA (8-1.01) (Continued)									
6S/10W-5M1	1400 feet north of Adams Avenue, 1200 feet east of Wright (Brookhurst) Avenue.	Marshburn Farms	12-20-57	Irr.		12	235	76-100; 142-154	Yes		Yes
6S/10W-6B2	125 feet south of Garfield and 200 feet east of Bushard.	William Lamb		Dom.		2	100				Yes
6S/10W-6H2	50 feet west of Wright Street and 0.45 mile south of Garfield Avenue.	Walter Lamb	1948	Irr.			102				Yes
6S/10W-6L2	200 feet west of Bushard Street and 0.5 mile south of Garfield Avenue.	H. S. Lamb	Prior to 1919	Dom.	12	7	150		No	No	Yes
6S/10W-7D3	2000 feet west of Bushard Street and 200 feet south of Adams.	Jim Bushard	1942	Dom.		4	125				Yes
6S/10W-7G1 13233H	250 feet east of Bushard Street and 0.21 mile north of Indianapolis.	Alban Holtz		Dom.			112		No	No	Yes
6S/10W-18B4	150 feet east of Bushard Street and 100 feet south of Atlanta Avenue.	E. H. Gisler		Dom.		12	89				Yes
6S/11W-1B1	550 feet south of Garfield Avenue and 0.28 mile west of Cannery Avenue.	Anaheim Sugar Co.		Irr.	13.3	12	200				Yes
6S/11W-1J3	0.50 mile north of Adams and 0.25 mile west of Cannery Avenue.	Urban Plavan		Irr.							Yes
6S/11W-3R2	0.30 mile south of Mansion and 300 feet west of Golden West Street extension.	Huntington Beach Golf Course	1950	Irr.		8	279				Yes
6S/11W-13F4	120 feet north of, and 400 feet west of intersection of Hamilton and Newland Streets.	Wilshire Oil Co.	4-1956	Ind. fire prev.		10	200	164-184	Yes		

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA
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									Log	Water levels	Analyses
		CHINO BASIN (8-2.01)									
1S/6W-29R1	200 feet west of Etiwanda Avenue and 0.75 mile north of Marley Avenue.	S. & S. Ranch		Dom. Irr.					No	No	Yes
1S/7W-28R1	400 feet south of intersection of Highway 60 and Corona Avenue, 50 feet east of Corona (Baker) Avenue.	Peach Park Water Co.	3-27-28	Dom. Irr.		16	351		Yes	No	Yes
1S/7W-34M1	125 feet east of Vineyard Avenue and 100 feet south of Francis Avenue.	Wilder and Camel	Prior to 1929	Dom. Irr.		10	326.5		No	No	Yes
2S/7W-10M1	90 feet south of Chino Avenue and 0.12 mile east of Vineyard Avenue, east of Chino.	P. J. Crevolin		Dom. Irr.			375		No	No	Yes
2S/7W-15A1	0.55 mile south of Chino Avenue and 0.2 mile west of Archibald Avenue, north well of two wells.	Pietro and Domenico Enrico	2-1930	Dom.		8	436		Yes	No	Yes
2S/7W-21L1	40 feet west of Walker Avenue and 350 feet south of Merrill Avenue, 0.5 mile east of Grove Avenue.	C. T. Merrill		Dom. Irr.	657	14	207		Yes	No	Yes
2S/7W-23E1	120 feet east of Archibald Avenue and 1,267 feet north of Merrill Avenue.	A. Omlin		Dom.		7	104		No	No	Yes
2S/7W-27A1	230 feet west of Archibald Avenue, 10 feet south of Cloverdale Road extended, westerly wall of two walls, northwest of Norco.	Luginbill and Imbach		Dom.	642		310		No	No	Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA

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									Log	Water levels	Analyses
		BUNKER HILL BASIN (8-2.06)									
1N/4W-29E1	123 feet south of center line of Darty Street and 27 feet east of center line of California Street.	Delman Water Co.		Dom.		16	429		No	No	Yes
1N/4W-29F1	2800 feet north of Highland Avenue, 2000 feet east of California Street and 500 feet southwest of Cajon Boulevard.	Delman Water Co.	3-8-56	Mun.		16	451	240-340; 418-443	Yes		Yes
1S/3W-8M1	Norton Air Force Base, 600 feet south of main runway, 300 feet east of section line and 300 feet south of intersection of runway with 1140 foot contour.	Norton Air Force Base		Mil.		12	150	78-148			Yes
1S/3W-9E2	400 feet east of Alabama Street and 175 feet north of road into rock company 1700 feet south of Third Street.	Tri-City Rock Co.	Fall 1954	Ind.		14	400				Yes
1S/3W-16A1	30 feet west of and 30 feet north of the north end of Texas Street at the Santa Ana River, southeast of San Bernardino.	Cook Orchards	Deepened in 1954	Irr.		20	200 ±				Yes
1S/4W-13F3	1400 feet east of Tippicanoe, 150 feet north of Central Avenue.	Mesbur Realty Co.	1926	Dom.	1060	12	123	102-120			Yes
1S/4W-13G1	2500 feet east of Tippicanoe, 100 feet south of Central Avenue projected.	Gage Canal Co.	1946	Irr.	1063	24	350				Yes
1S/4W-13L1	At caretaker's house, near upper end of Gage Canal, 10 feet south of canal, 1000 feet east of Tippicanoe, 1300 feet north of San Bernardino Avenue.	Gage Canal Co.	1890	Irr.		10	300				Yes

Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

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									Log	Water levels	Analyses
	SAN LUIS REY VALLEY, MISSION BASIN (9-7.01)										
11S/4W- 4N1	1.55 miles north from Mission San Luis Rey along Camp Pendleton Road and 200 feet south of Camp Pendleton Road on east side of dirt road.	George Nagata	8-19-52	Dom. Irr.		14	131	104-131	Yes	No	Yes
11S/4W- 5K1	1.0 mile north of Mission San Luis Rey on north side of Pendleton Road. East of two wells.	K. Johnson	3-25-53	Dom. Irr.		14	207	169-207	Yes		Yes
11S/4W- 8H1	1050 feet east of County road running north from San Luis Rey and 45 feet south of private road.	J. S. Alvarado		Dom. Irr.		12	121				Yes
11S/4W- 8J1	54 feet north of Highway 76, and 51 feet east of road to Academy of the Little Flower.	Academy of the Little Flower	8-1951	Dom. Irr.		16	227		Yes	No	Yes
11S/4W- 8N1	1300 feet southwest of intersection of Highway 76 with Camp Pendleton Road and 87 feet south of Highway 76.	Clarence-Nishizo	3-1950	Dom. Irr.		16	180		No	No	Yes
11S/4W-18C1	2900 feet northeast along highway 76 from pumping plant; 1350 feet northwest along private road, 15 feet southwest of road.	S. Davies	8-1937	Dom. Irr.	40.5	14	134		Yes	Yes	Yes
11S/4W-18C9	150 feet west of powerline and 2500 feet north of State Highway 76 along powerline.	Carlsbad Mutual Water Company		Mun.							Yes
11S/4W-18L4	50 feet south of Highway 76 and 160 feet east of reservoir.	Carlsbad Mutual Water Company	1951	Mun.		16	204		No	No	Yes
11S/5W-13L1	400 feet south of San Luis Rey River and 2100 feet northwest of highway 76.	Earl D. Amsler		Dom. Irr.					No	No	Yes
11S/5W-13Q1	0.3 mile north of Oceanside pumping plant. East side of Airfield.	City of Oceanside	7-36	Mun. Standby			152			Yes	Yes
11S/5W-23E1	In San Luis Rey River Channel, 250 feet north of mouth of Lawrence Canyon.	Walter Johnson	1948	Ind.		14	110		No	No	Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)

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									Log	Water levels	Analyses
		EL CAJON VALLEY (9-16)									
15S/1E-31R1	220 feet east of Highway 80 and 0.16 mile north of Flume Drive, northeast of El Cajon.	R. G. Alexander	1948	Dom. Irr.		8	112		No	No	Yes
16S/1W-1G1	30 feet west of Bostonia Street and 0.24 mile north of Broadway, Bostonia.	Jack Graves	1498	Dom. Irr.		20	64				Yes
16S/1W-2K6	250 feet south of Broadway and 0.28 mile west of First Avenue, north of El Cajon.	Bob Gilb	1920	Dom. Irr.		12	50		No	No	Yes
16S/1W-3C2	At El Cajon Seqage Plant, 140 feet east of old railroad crossing and 0.40 mile north of Broadway, El Cajon.	City of El Cajon	1952	Dom.		8					Yes
16S/1W-3N1	0.81 mile north of Main Street and 300 feet east of Pierce Street, west of El Cajon.	Ed Fletcher Co.	May 1951	Mun.		8	532		Yes	No	Yes
16S/1W-10D1	0.38 mile north of Main Street and 300 feet east of Pierce Street, west of El Cajon.	Ed. Fletcher Co.	1946	Mun.		8	521		Yes	No	Yes
16S/1W-10E2	120 feet north of Main Street and 0.4 mile west of Johnson Avenue, west of El Cajon.	Ed. Fletcher Co.	2-9-46	Mun.		8	521		Yes	No	Yes
16S/1W-11P4	50 feet north of Camden Avenue and 141 feet east of Taft Avenue, El Cajon.	J. M. Conaway	1949	Irr.		24	50		No	No	Yes
16S/1W-12J4	120 feet north of Lexington Avenue and 0.13 mile west of Third Street.	Bud Robinson		Dom.		42	72		No	No	Yes
16S/1W-15K2	40 feet south of Chase Avenue and 0.28 mile west of Magnolia Avenue.	R. S. Embleton		Dom.		60	24				Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

WELL DATA

1959

State well number and other number	Location	Owner	Date completed	Use [a]	Ground surface elevation [b]	Size of casing in inches	Total depth in feet	Intervals of perforated casing in feet	Data available		
									Log	Water levels	Analyses
		TIA JUANA VALLEY BASIN (9-19)									
18S/2W-32H1	0.25 mile south of Sunset and 0.12 mile east of 15th Street extended.	California Water and Telephone Co.		Test		10	28		No	No	Yes
18S/2W-32P2	0.04 mile south of Sunset and 2.1 miles west of 19th Street.	California Department of Veterans Affairs		Observ.		12-3	37		No	No	Yes
18S/2W-32P4	0.03 mile east of west end of Sunset Avenue (Banana).	California Water and Telephone Co.		Test		8	100	85-100	No	No	Yes
18S/2W-33K4	81 feet east and 25 feet north of intersection of Sunset and 19th Street.	James Jackson		Irr.		12			No	No	Yes
18S/2W-35L1	Northeast corner intersection of Gate 2 (Dairy Mart) Road and U. S. Highway 101.	Henry Schaffner		Irr.					No	No	Yes
19S/2W-2E1	West side Gate 2 (Dairy Mart) Road and 0.35 mile south of Tia Juana River.			Irr.					No	No	Yes
19S/2W-3A1	0.25 mile west of Gate 2 (Dairy Mart) Road and 0.25 mile south of Tia Juana River.	Aballo and Wright		Irr.		12			No	No	Yes
19S/2W-4A5	720 feet west of National Avenue and 0.32 mile south of Sunset (Banana).	California Water and Telephone Co.				12	87		No	No	Yes
19S/2W-5C6	0.5 mile south of Sunset (Banana) and 1.22 miles west of 19th Street.	California Water and Telephone Co.		Test		8	100		No	No	Yes
19S/2W-5G18	0.25 mile north of Monument Road and 0.8 mile west of 19th Street.	Knox Dairy		Irr.							Yes
19S/2W-5L2	15 feet north of Monument Road on the eastern boundary of Border Field (extended northerly).	California Water and Telephone Co.		Test	6.5	10	95		Yes	No	Yes

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)

b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

a Domestic (Dom), Municipal (Mun), Irrigation (Irr), Industrial (Ind), and Livestock (Stk)
b U S Geological Survey datum (Feet above mean sea level unless otherwise indicated)

ANALYSES OF GROUND WATER
1959

Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by b
SANTA MARIA RIVER VALLEY (3-12)																						
E. C. Lyman Dom.	9N/32W-17G1	4-21-59	--	1242	7.9	106 5.28	79 6.52	60 2.61	2.7 0.070	0 0.00	240 3.93	422 8.78	38 1.06	12 0.20	0.3 0.01	0.34	19	914	18	590	393	Term
		9- 9-59	--	1429	7.7	140 6.98	67 6.68	66 2.85	2.7 0.069	0 0.00	361 5.92	443 9.22	35 0.97	25 0.40	0.2 0.01	0.28	22	1070	17	683	387	Term
J. S. Calderon, et al. Irr.	9N/33W- 2A1	6- 9-59	--	1333	7.6	125 6.24	73 5.99	92 3.99	3.8 0.096	0 0.00	297 4.86	460 9.58	63 1.77	7.0 0.11	0.4 0.02	0.34	25	1030	24	611	368	Term
Lake Marie Farms Dom.	9N/33W- 8K1	4-21-59	--	925	7.9	87 4.34	49 3.99	45 1.94	2.3 0.060	0 0.00	239 3.91	268 5.59	24 0.69	3.0 0.05	0.2 0.01	0.19	24	682	19	417	221	Term
		9- 9-59	69	984	7.7					0 0.00	245 4.01		28 0.77							417	216	Term
W. E. Houke Estate Dom.	9N/33W- 9A1	6-10-59	--	657	7.4					0 0.00	45 0.74		159 4.46							96	59	Term
		10- 7-59	--	641	7.1	18 0.90	14 1.16	84 3.64	2.7 0.070	0 0.00	53 0.87	7.0 0.15	160 4.51	14 0.24	0.1 0.00	0.38	24	401	63	103	59	Term
Blockman School Dom.	9N/33W-12R1	9-29-59	--	1080	8.1					0 0.00	290 4.76		26 0.73							499	261	DWR
Mattia Bognuda Irr.	9N/34W- 9E1	4-21-59	66	712	7.1	42 2.08	22 1.84	59 2.53	2.7 0.070	0 0.00	93 1.51	80 1.67	110 3.10	0 0	0.2 0.01	0.19	46	454	39	196	120	Term
C. J. Donovan Irr.	10N/34W- 3P2	4-21-59	61	1015	8.2	98 4.91	46 3.75	59 2.53	2.7 0.070	0 0.00	252 4.08	283 5.89	40 1.13	12 0.20	0.6 0.03	1.11	18	752	22	433	229	Term
Grisingher and Signorelli Irr.	10N/34W- 6N1	4-21-59	61	1593	8.0	138 6.89	95 7.81	78 3.38	3.5 0.090	0 0.00	235 3.85	545 11.35	70 1.99	78 1.27	0.4 0.02	0.76	19	1179	19	735	542	Term
		9-29-59	61	1700	7.8					0 0.00	307 5.04		74 2.09							834	582	DWR
J. Mahoney Irr.	10N/34W-16R1	5-26-59	62	1826	7.4					0 0.00	294 4.81		74 2.07							836	595	Term

ANALYSES OF GROUND WATER
1959

Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by [b]
						SANTA MARIA RIVER VALLEY (3-12) (Continued)																
J. Mahoney Irr. (Cont.)	10N/34W-16R1	9-29-59	62	1865	7.9	167 8.36	95 7.76	101 4.42	4.3 0.110	0 0.00	261 4.29	646 13.45	74 2.07	47 0.77	0.7	0	20	1368	21	806	591	Term
E. H. Moore Irr.	10N/34W-19H1	5-26-59	64	1470	7.9	143 7.15	66 5.40	87 3.78	3.5 0.090	0 0.00	259 4.24	448 9.32	85 2.39	22 0.36	0.5 0.02	0.32	24	1074	23	628	416	Term
		9-29-59	63	1743	7.6	145 7.23	67 5.49	85 3.69	4.0 0.093	0 0.00	256 4.19	455 9.47	97 2.72	24 0.38	0.4 0.02	0.46	22	1180	22	636	426	Term
D. Hobbs Irr.	10N/34W-21R1	6-10-59	--	1180	7.9	94 4.68	59 4.86	70 3.04	2.5 0.064	0 0.00	160 2.62	393 8.19	62 1.75	15 0.24	0.3 0.02	0.28	25	840	24	477	356	Term
		9-29-59	--	1273	7.2	120 6.01	63 5.17	64 2.79	3.1 0.080	0 0.00	243 3.99	387 8.07	67 1.87	12 0.20	0.6 --	0.16	20	925	20	559	359	Term
Bradley Land Company Irr.	10N/34W-26H2	4-21-59	64	1151	8.1	101 5.06	61 5.04	64 2.79	2.7 0.070	0 0.00	229 3.75	346 7.21	61 1.72	10 0.17	0.5 0.02	0.34	19	840	22	505	317	Term
		9- 9-59	65	1197	7.9	99 4.92	58 4.81	65 2.84	2.7 0.070	0 0.00	194 3.18	342 7.11	78 2.21	17 0.27	0.3 0.02	0.42	23	820	22	487	328	Term
Union Sugar Company Irr.	10N/35W- 4C1	4-21-59	61	1684	7.7	190 9.50	83 6.84	98 4.24	4.0 0.110	0 0.00	235 3.85	706 14.70	76 2.14	10 0.16	0.4	0.23	29	1291	20	817	624	Term
		9-11-59	61	1831	7.3	212 10.59	89 7.29	91 3.94	3.5 0.090	0 0.00	321 5.26	687 14.30	74 2.07	11 0.18	0.7	0.20	28	1385	18	894	631	Term
Union Sugar Company Dom. & Irr.	10N/35W- 5J1	5-26-59	62	1589	7.8	132 6.57	65 5.32	78 3.39	3.3 0.084	0 0.00	200 3.28	483 10.06	67 1.87	27 0.44	0.3 0.01	0.46	23	1065	22	595	431	Term
Waller Flower-Seed Company Irr.	10N/35W- 9F1	5-26-59	64	1533	7.9	139 6.93	74 6.05	96 4.17	3.9 0.099	0 0.00	153 2.50	600 12.50	82 2.31	14 0.23	0.4 0.02	0.34	26	1117	24	649	524	Term
Agnes F. King Dom. & Irr.	10N/35W-16M1	4-21-59	62	2685	7.8	271 13.50	118 9.66	201 8.76	5.0 0.120	0 0.00	242 3.96	1149 23.93	153 4.31	23 0.37	0.4	0.40	26	2021	27	1158	960	Term
		9-29-59	62	2440	8.0	271 13.50	132 10.85	224 9.75	4.9 0.125	0 0.00	311 5.10	1172 24.25	145 4.10	14 0.23	0.4 0.02	0.21	33	2267	28	1218	963	DWR

ANALYSES OF GROUND WATER
1959

ANALYSES OF GROUND WATER

1959

Owner and use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by b
SANTA MARIA RIVER VALLEY (3-12) (Continued)																						
Union Sugar Co. Irr.	10N/35W-17D1	5-26-59	61	2290	7.6	201 / 10.04	113 / 9.34	169 / 7.35	4.9 / 0.125	0 / 0.00	199 / 3.26	924 / 19.24	150 / 4.22	16 / 0.26	0.2 / 0.01	0.56	28	1600	27	969	806	Term
Agnes F. King Irr.	10N/35W-21C1	4-21-59	63	1713	7.8	126 / 6.31	74 / 6.11	143 / 6.20	4.0 / 0.100	0 / 0.00	248 / 4.07	484 / 10.08	147 / 4.15	35 / 0.56	0.2	0.34	35	1230	33	621	417	Term
		9-29-59	63	1700	7.4					0 / 0.00	349 / 5.72		136 / 3.84							686	400	DWR
Avilina Morgante Irr.	10N/36W-12R1	9-29-59	63	1185	7.4					0 / 0.00	251 / 4.12		70 / 1.97							525	319	DWR
Frank Silva Dom. & Stk.	11N/34W-19Q1	9-11-59	--	1085	7.6	99 / 4.92	45 / 3.73	64 / 2.80	2.7 / 0.070	0 / 0.00	214 / 3.50	282 / 5.88	66 / 1.86	6.0 / 0.01	0.3 / 0.01	0.18	32	770	24	433	258	Term
Alfred Guerra Dom. & Irr.	11N/34W-29P2	4-21-59	64	1006	8.1	95 / 4.77	39 / 3.22	61 / 2.64	2.3 / 0.060	0 / 0.00	204 / 3.35	240 / 5.01	69 / 1.94	16 / 0.27	0.3 / 0.01	0.19	26	715	25	400	232	Term
Union Sugar Co. Dom.	11N/35W-18M1	4-21-59	--	1399	8.4					18 / 0.59	184 / 3.02		51 / 1.42							606	455	Term
		9-30-59	--	1307	7.9	135 / 6.74	60 / 4.94	82 / 3.55	3.9 / 0.100	0 / 0.00	202 / 3.31	514 / 10.70	53 / 1.49	0 / 0.00	0	0.24	27	983	23	584	418	Term
Mary B. Enos Irr.	11N/35W-19E2	6-10-59	--	1308	8.0	136 / 6.77	52 / 4.25	76 / 3.30	3.4 / 0.088	0 / 0.00	253 / 4.15	429 / 8.93	48 / 1.35	3.0 / 0.04	0.1	0.54	32	960	23	551	343	Term
Punnels Irr.	11N/35W-26M1	4-21-59	62	985	8.2	103 / 5.14	37 / 3.06	61 / 2.63	2.7 / 0.070	0 / 0.00	188 / 3.09	301 / 6.26	35 / 0.97	12 / 0.19	0.6	0.41	27	715	24	410	255	Term
		9-29-59	62	1030	8.2					12 / 0.40	171 / 2.80		43 / 1.21							445	305	DWR
Pat Mohoney Irr.	11N/35W-28B1	4-21-59	64	731	7.9	67 / 3.35	24 / 1.98	47 / 2.06	2.3 / 0.060	0 / 0.00	146 / 2.40	179 / 3.72	44 / 1.24	10 / 0.16	0.2	0.38	31	516	28	267	147	Term

ANALYSES OF GROUND WATER
1959

Owner and use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by b
SANTA MARIA RIVER VALLEY (3-12) (Continued)																						
Union Sugar Co. Irr.	11N/35W-33F1	5-26-59	60	1596	7.9	144 / 7.21	82 / 6.71	89 / 3.87	3.5 / 0.090	0 / 0.00	197 / 3.23	588 / 12.25	86 / 2.42	15 / 0.25	0.3 / 0.01	0.34	26	1173	22	696	534	Term
		9-29-59	62	1895	7.4	229 / 11.44	85 / 7.04	91 / 3.96	3.9 / 0.100	0 / 0.00	443 / 7.26	591 / 12.30	110 / 3.10	12 / 0.20	0.4	0	25	1446	18	924	561	Term
Mary B. Enos Dom.	11N/36W-13R1	4-21-59	--	1307	7.5	161 / 8.05	44 / 3.59	77 / 3.36	4.0 / 0.090	0 / 0.00	249 / 4.08	468 / 9.74	47 / 1.32	2.0 / 0.03	0.1	0.34	36	983	22	582	378	Term
		9-29-59	--	1300	7.6					0 / 0.00	256 / 4.20		43 / 1.21							583	373	DWR

a. Gravimetric Determination
b. Analysis by Department of Water Resources (DWR) or Terminal [illegible] Laboratories, Inc. (Term) as indicated.

ANALYSES OF GROUND WATER
1959

ANALYSES OF GROUND WATER

1959

Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by [b]
CUYAMA VALLEY (3-13)																						
U. S. Government Forest Service Dom.	9N/24W-19F1	4-24-59	65	1,892	7.6					0 0.00	189 3.10		17 0.49							959	804	Term
		9-10-59	--	1,825	7.8					0 0.00	212 3.48		21 0.58							922	748	Term
E. H. Mettler & Sons Dom.	10N/25W-22E1	4-24-59	65	2,107	8.0	272 13.55	113 9.32	104 4.50	4.3 0.110	0 0.00	154 2.53	1122 23.36	18 0.51	17 0.28	1.8	0.23	34	1,639	16	1144	1017	Term
E. H. Mettler & Sons Dom. & Irr.	10N/25W-23E1	7-28-59	69	2,066	7.5	228 11.38	81 6.66	145 6.28	5.0 0.120	0 0.00	132 2.16	935 19.47	115 3.24	12 0.20	0.7 0.03	1.23	21	1,549	26	902	794	Term
Adolf Kirschenmann	10N/25W-30F1	7-28-59	64	1,879	7.5	235 11.74	109 8.98	77 3.34	3.5 0.090	0 0.00	167 2.73	942 19.62	23 0.63	58 0.94	0.4 0.02	0.08	17	1,495	14	1036	899	Term
Pam Barkley Irr.	10N/25W-32H1	10- 6-59	62	1,729	7.3	206 10.28	92 7.60	68 2.93	3.5 0.090	0 0.00	178 2.92	827 17.22	34 0.96	29 0.46	1.4	0.12	15	1,390	14	894	748	Term
Herbert Russell Dom. & Irr.	10N/26W- 4R1	4-24-59	67	1,849	7.9	221 11.07	84 6.89	113 4.88	4.3 0.110	0 0.00	154 2.53	938 19.53	39 1.08	2.0 0.03	0.9 0.04	0.49	17	1,424	21	898	771	Term
		9-10-59	67	1,788	7.5					0 0.00	160 2.63		39 1.08							900	768	Term
Cuyama Ranch Springs Stk.	10N/26W-14C1, C2, & C3	4-24-59	64	1,786	8.3	240 12.00	85 7.01	79 3.45	4.0 0.100	13 0.42	146 2.40	929 19.34	22 0.63	4.0 0.07	1.8	0.13	21	1,386	15	951	831	Term
		9-10-59	65	1,900	7.6					0 0.00	190 3.11		23 0.63							1046	891	Term
H. Russell Irr.	10N/26W-14C4	10- 6-59	--	1,883	8.1	234 11.70	91 7.48	81 3.51	4.0 0.108	0 0.00	165 2.71	945 19.66	21 0.58	3.0 0.05	0.7 0.04	0.32	17	1,430	15	909	773	Term
Stanley Germain Dom. & Irr.	10N/26W-21Q2	5-27-59	75	1,268	8.0	94 4.69	33 2.73	135 5.85	4.1 0.105	0 0.00	193 3.17	462 9.62	22 0.58	3.0 0.05	0.2 0.01	0.42	37	915	44	371	212	Term
		9-10-59	78	1,286	7.6	89 4.44	27 2.19	146 6.35	4.1 0.105	0 0.00	184 3.02	446 9.28	22 0.58	2.0 0.04	0.2 0.01	0.34	34	910	49	332	181	Term

ANALYSES OF GROUND WATER

1959

Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by [b]
CUYAMA VALLEY (3-13) (Continued)																						
Goehring Bros. Dom. & Irr.	10N/26W-23P1	10- 6-59	--	2,120	7.8	275 13.72	95 7.82	96 4.17	5.0 0.123	0 0.00	160 2.62	1076 22.41	34 0.94	10 0.16	0.3 0.02	0.02	21	1,620	16	1077	946	Term
W. Smith Dom. & Irr.	10N/27W-11C1	4-24-59	--	3,974	7.8	417 20.80	237 19.54	345 15.00	6.0 0.160	0 0.00	134 2.20	2418 50.35	82 2.31	10 0.17	0.5	0.34	19	3,215	27	2017	1907	Term
		7-28-59	68	4,161	7.2	479 23.88	250 20.64	337 14.65	6.0 0.160	0 0.00	342 5.60	2442 50.84	86 2.42	34 0.55	0.6 0.03	0.43	22	4,289	25	2226	1946	Term
		10- 6-59	--	4,250	7.5	467 23.28	266 21.88	355 15.45	7.0 0.170	0 0.00	354 5.80	2529 52.66	86 2.42	12 0.20	0.8	0.90	22	4,032	25	2258	1993	Term

a. Gravimetric determination
b. Analysis by Terminal Testing Laboratories, Inc., (Term)

ANALYSES OF GROUND WATER

ANALYSES OF GROUND WATER

1959

Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in ppm / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by [b]
						OXNARD PLAIN BASIN (4-4.01)																
Ed Murdhardt Dom. & Irr.	1N/21W-30A1 11-W-17	5- 8-59	--	1037	7.8					0 0.00	307 5.04		41 1.14							360	108	Term
		12-11-59	68	1047	7.4					0 0.00	295 4.84		36 1.02							371	129	DWR
U. S. Naval Air Station Mun.	1N/21W-31L1 NAVY #3	5- 7-59	74	979	7.5	74 3.68	29 2.37	92 3.99	5.9 0.150	0 0.00	276 4.53	207 4.30	60 1.70	3.0 0.05	0.4	0.42	41	716	39	303	76	Term
City of Oxnard Mun.	1N/22W-3F4 9-U-9	5- 7-59	62	1418	7.4					0 0.00	267 4.39		58 1.62							558	338	Term
		12-10-59	63	1500	7.3	177 8.83	50 4.11	100 4.35	5.0 0.128	0 0.00	293 4.80	518 10.80	58 1.64	17 0.27	0.6 0.03	0.70	30	1150	25	647	407	DWR
D. McGrath Estate Dom. & Stk.	1N/22W-7D1 7-U-2	5- 7-59	--	1198	7.9					0 0.00	248 4.06		45 1.24							3018	2815	Term
		8-17-59	--	1080	7.6	119 5.95	42 3.45	90 3.90	0.62 0.016	0 0.00	238 3.90	394 8.20	39 1.10	1.4 0.02	0.9 0.05	0.25	24	869	29	470	275	DWR
		9-24-59	--	1228	8.1	122 6.09	42 3.43	91 3.96	4.0 0.108	0 0.00	249 4.08	398 8.29	44 1.22	0 0	0.9 0.04	0.90	25	905	29	476	272	Term
		12- 2-59	--	1181	7.5					0 0.00	246 4.04		39 1.10							474	272	DWR
Ignatius Friedrich Dom. & Irr.	1N/22W-9Q3	5- 7-59	--	1263	7.6					0 0.00	248 4.06		46 1.30							507	304	Term
		8-17-59	--	1315	8.0	127 6.33	50 4.12	92 4.02	4.3 0.110	0 0.00	250 4.10	432 8.99	45 1.25	0 0	0.6 0.03	0.88	23	960	28	523	318	Term
City of Oxnard Mun.	1N/22W-15B3 #7	9- 3-59	--	1480	7.6	156 7.78	59 4.82	90 3.92	4.5 0.120	0 0.00	271 4.44	510 10.62	56 1.58	14 0.23	0.7 0.04	0.67	30	1130	24	630	408	DWR

ANALYSES OF GROUND WATER
1959

Owner and Use	State well number and other number	Date sampled	Temp. in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N C ppm.	Analyzed by [b]
OXNARD PLAIN BASIN (4-4.01) (Continued)																						
City of Oxnard (continued) Mun.	1N/22W-15B3 #7	12-10-59	68	1324	7.4	133 / 6.64	47 / 3.88	92 / 4.00	3.8 / 0.100	0 / 0.00	264 / 4.32	408 / 8.50	46 / 1.30	5.6 / 0.09	0.6 / 0.03	0.59	30	982	27	526	310	DWR
Hollywood Beach Resort Dom.	1N/22W-18E1 8-V-12	5- 7-59	--	1220	7.6					0 / 0.00	241 / 3.95		48 / 1.34							461	263	Term
U. S. Navy Dom.	1N/22W-20B1 NCBC #4	5- 7-59	66	1094	7.7					0 / 0.00	193 / 4.03		41 / 1.14							404	202	Term
		11-20-59	--	1145	7.4	121 / 6.04	37 / 3.02	74 / 3.22	6.3 / 0.160	0 / 0.00	246 / 4.04	348 / 7.25	36 / 1.02	3.4 / 0.05	0.5 / 0.03	0.47	30	795	26	453	251	DWR
Silver Strand Mutual Water Company Mun	1N/22W-20E2 8-V-27	5- 7-59	--	1100	8.0					0 / 0.00	192 / 4.00		42 / 1.17							426	226	Term
		12-11-59	--	1183	8.0					0 / 0.00	261 / 4.28		39 / 1.10							470	256	DWR
U. S. Navy Obs.	1N/22W-20R1 8-V-21	5- 7-59	66	17486	7.3	407 / 20.32	684 / 56.36	2500 / 108.68	32.6 / 0.840	0 / 0.00	208 / 3.42	1035 / 21.55	5840 / 164.34	0 / 0	0.8 / 0.04	0.87	24	11224	58	3834	3663	Term
		11-30-59	65	23800	6.9	1074 / 53.59	650 / 53.43	3900 / 169.65	44 / 1.130	0 / 0.00	190 / 3.12	1349 / 28.10	8650 / 243.93	0 / 0	0.3 / 0.02	1.60	20	19210	61	5335	5179	DWR
K. L. Vernau Dom. & Irr.	1N/22W-23C1 10-V-13	5- 7-59	--	1145	7.8					0 / 0.00	190 / 3.96		43 / 1.21							461	263	Term
		12-10-59	--	1197	7.4					0 / 0.00	254 / 4.16		40 / 1.13							465	257	DWR
S. R. Pidduck Irr.	1N/22W-26A1	5- 7-59	--	1166	7.6	120 / 5.92	34 / 2.75	86 / 3.91	4.2 / 0.110	0 / 0.00	247 / 4.05	366 / 7.62	45 / 1.24	0 / 0	0.7 / 0.04	0.40	34	839	30	433	230	Term
		8-10-59	--	1170	7.3	120 / 5.99	44 / 3.61	85 / 3.72	3.9 / 0.100	0 / 0.00	246 / 4.04	364 / 7.59	46 / 1.30	0 / 0	0.1	0.33	32	821	32	480	278	Term
		12-10-59	--	1156	7.6					0 / 0.00	259 / 4.24		40 / 1.13							461	249	DWR

ANALYSES OF GROUND WATER

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OWNER AND USE	STATE WELL NUMBER AND OTHER NUMBER	DATE SAMPLED	TEMP IN °F	SPECIFIC CONDUCTANCE (MICROMHOS AT 25°C)	pH	MINERAL CONSTITUENTS IN PARTS PER MILLION / EQUIVALENTS PER MILLION: CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM (Na)	POTASSIUM (K)	CARBONATE (CO_3)	BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	NITRATE (NO_3)	FLUORIDE (F)	BORON (B)	SILICA (SiO_2)	TOTAL DISSOLVED SOLIDS IN PPM [a]	PERCENT SODIUM	HARDNESS as $CaCO_3$: TOTAL PPM	HARDNESS as $CaCO_3$: N C PPM.	ANALYZED BY [b]
OXNARD PLAIN BASIN (4-4.01) (Continued)																						
R. E. Lown Dom. & Irr.	1N/22W-28A2	5- 7-59	--	1788	7.8	175 / 8.77	61 / 4.99	99 / 4.30	4.9 / 0.130	0 / 0.00	243 / 3.98	313 / 6.52	283 / 7.97	0 / 0	0.7 / 0.04	0.58	32	1216	24	688	489	Term
		12-11-59		5899	7.7	672 / 33.53	221 / 18.17	193 / 8.40	10 / 0.250	0 / 0.00	195 / 3.20	413 / 8.61	1690 / 47.66	3.0 / 0.05	0.5 / 0.03	0.66	25	5069	14	2585	2425	DWR
Kalof Pulp and Paper Co. Dom. and Ind.	1N/22W-28H2 9-W-18	5- 7-59	66	1205	7.9					0 / 0.00	245 / 4.01		55 / 1.55							465	264	Term
Ventura County Game Preserve	1N/22W-36K1	2- 6-59		1730	7.7	179 / 8.93	53 / 4.36	111 / 4.83	6.0 / 0.154	0 / 0.00	261 / 4.28	319 / 6.64	255 / 7.19	3.0 / 0.048	0.5	0.64	30	1195	26	664		DWR
		5- 8-59		1361	7.7	139 / 6.93	39 / 3.20	92 / 3.98	4.9 / 0.130	0 / 0.00	257 / 4.22	306 / 6.37	148 / 4.17	2 / 0.04	0.83	0.78	37	971	28	507		Term
		11-26-59	69	1667	7.8					0 / 0.00	268 / 4.40		237 / 6.68							645		DWR
Ventura County Game Preserve	1N/22W-36K3	11-26-59	69	5800	7.8	496 / 24.75	162 / 13.30	621 / 27.00	10.2 / 0.260	0 / 0.00	232 / 3.80	528 / 10.99	1837 / 51.80	12 / 0.192	0.9	0.56	39	4563	41	1903		DWR
Oasis Motel Dom.	2N/22W-27M2 9-T-27	5- 8-59		1321	8.1	134 / 6.71	43 / 3.63	94 / 4.11	4.0 / 0.110	0 / 0.00	270 / 4.43	420 / 8.75	53 / 1.48	11 / 0.18	0.6	0.49	30	977	28	517	295	Term
		12-10-59		1222	7.7	132 / 6.59	40 / 3.29	88 / 3.83	4.6 / 0.118	0 / 0.00	261 / 4.28	395 / 8.22	42 / 1.18	15 / 0.24	0.6 / 0.03	0.62	30	915	28	494	280	DWR
Frank McGrath Estate Dom.	2N/23W-25Q1 7-T-5	5- 8-59		1418	7.4					0 / 0.00	254 / 4.17		58 / 1.62							462	253	Term

a. Gravimetric determination.
b. Analysis by State Department of Water Resources (DWR) or Terminal Testing Laboratories Inc. (Term) as indicated.

ANALYSES OF GROUND WATER
1959

Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in ppm / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by [b]
WEST COAST BASIN (4-11.02)																						
SANTA MONICA BAY AREA																						
Los Angeles Department of Water and Power	2S/15W-34K1	3-27-59	71	948	7.7	59 / 2.96	27 / 2.17	90 / 3.92	4.9 / 0.130	0 / 0.00	175 / 2.86	91 / 1.90	129 / 3.63	41 / 0.67	0.2 / 0.01	0	33	646	43	256	113	Term
		10- 9-59	71	960	7.9	63 / 3.15	27 / 2.25	89 / 3.87	4.7 / 0.120	0 / 0.00	207 / 3.40	83 / 1.72	135 / 3.80	46 / 0.74	0.2 / 0.01	0.18	32	607	41	270	100	DWR
Standard Oil Company Ind.	3S/14W-7K2 1317A	4-16-59	73	974	8.1					0. / 0.00	491 / 8.05		82 / 2.30							235	0	DWR
		10-30-59	70	1045	7.6					0 / 0.00	505 / 8.28		85 / 2.39							236	0	DWR
California Water Service Company Mun.	3S/14W-29M1 722C	4-10-59	74	698	7.8					0 / 0.00	235 / 3.85		96 / 2.70							215	23	DWR
		10-19-59	73	705	7.6					0 / 0.00	235 / 3.85		98 / 2.75							215	23	DWR
City of Manhattan Beach Obs.	3S/14W-30D1 701F	3- 9-59		2170	7.9	42	17	400[c]		0	176	203	507	0						174		LACFCD
		8-11-59		2080	7.8	34	14	389[c]		0	97	244	469	0						140		LACFCD
City of Manhattan Beach Mun.	3S/14W-30G1 711C	4-10-59	75	1060	8.0	108 / 5.40	30 / 2.50	92 / 4.00	7.8 / 0.200	0 / 0.00	223 / 3.65	43 / 0.89	262 / 7.40	2.3 / 0.04	0.4 / 0.02	0.06	31	827	33	395	213	DWR
		10-19-59	72	1370	8.0	122 / 6.10	37 / 3.05	91 / 3.95	6.3 / 0.162	0 / 0.00	220 / 3.60	53 / 1.11	307 / 8.65	2.4 / 0.04	0.2 / 0.01	0.08	34	869	30	458	278	DWR
City of Manhattan Beach Mun.	3S/14W-30H2 721K	10-19-59	72	780	8.2					0 / 0.00	238 / 3.90		112 / 3.15							228	33	DWR
California Water Service Company Obs.	3S/14W-31A3 712B	3-26-59	73	1263	7.9	89 / 4.04	29 / 2.38	102 / 4.44	7.6 / 0.190	0 / 0.00	142 / 2.34	29 / 0.61	293 / 8.26	0 / 0.00	0.2 / 0.01	0		784	40	321	204	Term

ANALYSES OF GROUND WATER
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Owner and use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by [b]
						WEST COAST BASIN (4-11.02) (Continued)																
						SANTA MONICA BAY AREA																
California Water Service Company Obs.	3S/14W-31A3 712B	10-15-59	73	967	7.9	71 / 3.54	22 / 1.81	90 / 3.92	6.0 / 0.154	0 / 0.00	207 / 3.40	23 / 0.48	190 / 5.36	1.5 / 0.02	0.2 / 0.01	0.12	10	570	42	260	90	DWR
Alvin A. Selleck	3S/14W-32F1 723	4-10-59	72	710	8.0					0 / 0.00	238 / 3.90		101 / 2.85							250	55	DWR
		10- 5-59	72	725	7.9	67 / 3.35	16 / 1.30	55 / 2.38	5.1 / 0.130	0 / 0.00	232 / 3.80	30 / 0.63	96 / 2.70	2.4 / 0.04	0.3 / 0.02	0.09	29	432	33	233	43	DWR
Los Angeles County Flood Control District Obs.	3S/15W-3A1 1265	6- 4-59	69	27000	7.9	1248	781	4440[c]		0	284	1340	10180	1.0				18270		6340		LACFCD
		9- 1-59	69	25000	6.0	1036	728	3990[c]		0	364	1160	9040					16320		5590		LACFCD
Los Angeles County Flood Control District Obs.	3S/15W-11M5 1277F	5-19-59	69	28500	7.5	606	651	6000[c]		0	180	1460	9800	20				18700		4200		LACFCD
		8-25-59	69	23390	7.9	685	655	5120[c]		0	201	1470	9780	70				17980		4414		LACFCD
Los Angeles County Flood Control District Obs.	3S/15W-11Q1 1288F	7-21-59	73	8610	7.8	596	191	875[c]		0	188	233	2680					4760		2280		LACFCD
		10-14-59	73	8620	7.1	617	196	934[c]		0	308	326	2750					5041		2353		LACFCD
City of El Segundo Mun.	3S/15W-12G1 1297E	4- 3-59	--	6118	7.2	553 / 27.6	141 / 11.6	483 / 21.0	23 / 0.600	0 / 0.00	226 / 3.70	235 / 4.89	1918 / 54.0	0	0	0.30	11	4184	34	1960	1775	Term
City of El Segundo Mun.	3S/15W-12H2 1307E	4- 3-59	--	1195	7.3	58 / 2.90	51 / 4.20	108 / 4.68	6.9 / 0.180	0 / 0.00	369 / 6.05	36 / 0.75	193 / 5.42	0 / 0	0.2 / 0.01	0.30	21	834	39	355	52	Term

ANALYSES OF GROUND WATER

1959

Owner and use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micramhos at 25° C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by [b]
						WEST COAST BASIN (4-11.02) (Continued) SANTA MONICA BAY AREA																
City of El Segundo Mun.	3S/15W-12H2 1307E	10-30-59	68	1841	7.2	144 / 7.19	48 / 3.91	166 / 7.20	90 / 0.220	0 / 0.00	359 / 5.89	125 / 2.60	339 / 9.55	0 / 0	0 / 0	0	25	1240	39	565	270	Term
City of El Segundo Mun.	3S/15W-12H3 1307D	10-30-59	67	950	7.8	70 / 3.50	26 / 2.15	90 / 3.93	6.6 / 0.168	0 / 0.00	394 / 6.45	12 / 0.26	117 / 3.30	2.5 / 0.04	0 / 0	0.18	34	545	40	283	0	DWR
Standard Oil Co. Ind.	3S/15W-13R6 1309M	3-24-59	74	1097	8.1	78 / 3.90	26 / 2.10	99 / 4.32	6.9 / 0.180	0 / 0.00	354 / 5.80	15 / 0.31	158 / 4.45	0 / 0	0 / 0	0.10	24	749	41	300	10	Term
City of Manhattan Beach Mun.	3S/15W-25A3 701D	4-24-59	72	1580	8.0	61	12	278[c]		0	180	299	242	0						202		LACFCD
		10- 9-59	72	1379	7.9	15 / 0.75	46 / 3.75	204 / 8.87	5.5 / 0.140	0 / 0.00	142 / 2.32	207 / 4.31	220 / 6.20	20 / 0.32	0.7 / 0.04	0.20	15	865	66	225	109	DWR
Los Angeles County Flood Control District Test	4S/14W-17F1 727H	2-26-59		2520		194	72	219[c]		0	286	3	722									LACFCD
		10-27-59		2500		195	72	226[c]		0	312	2	722	0								
Del Amo Estates Co. Obs.	4S/14W-17H2 737C	6- 8-59	75	737	8.3	42	12	118[c]		0	319	13	97	0				600		157		LACFCD

a. Gravimetric determination.
b. Analyses by Terminal Testing Laboratories Inc., (Term), State Department of Water Resources (DWR) or Los Angeles County Flood Control District (LACFCD), as indicated.
c. Na+K Determined together.

ANALYSES OF GROUND WATER

1959

Owner and Use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by [b]
WEST COAST BASIN (4-11.02)																						
HAWTHORNE-GARDENA AREA																						
George Branning Stk. & Dom.	4S/13W-6Q1 814A	4-17-59	67	1380	7.8	128 / 6.40	28 / 2.30	160 / 6.95	6.3 / 0.160	0 / 0.00	317 / 5.20	377 / 7.84	98 / 2.75	8.7 / 0.14	0.3 / 0.02	0.08	27	1029	44	435	175	DWR
		8- 4-59		1390	7.9	131	29	161[c]		0 / 0.00	339	363	91	14				1128		448		LACFCD
		10-21-59		1145	7.5	123 / 6.15	29 / 2.35	132 / 6.30	8.0 / 0.205	0 / 0.00	317 / 5.20	355 / 7.39	87 / 2.45	10.2 / 0.17	0.7 / 0.04	0.09	27	962	42	425	165	DWR
Chanslor Canfield Midway Oil Co. Ind.	4S/14W-9Q1 746	4- 7-59	68	601	8.1	40	13	76.6[c]		0 / 0.00	262		70	1.0				466		168		LACFCD
		10-28-59	72	1080	7.9					0 / 0.00	272 / 4.45		218 / 6.15							160	0	DWR
Union Oil Co. Ind.	4S/14W-22Q1 769	4-14-59	67	619	7.5					0 / 0.00	229 / 3.75		53 / 1.50							103	0	DWR
		10-21-59	72	623	8.0	21 / 1.06	10 / 0.79	98 / 4.24	3.9 / 0.100	0 / 0.00	242 / 3.96	7.0 / 0.14	74 / 2.08	0 / 0	0.3	0.16	44	446	68	93	0	Term
Edward Sidebotham Ind.	4S/14W-35E1 271A	4-15-59	68	915	7.5					0 / 0.00	354 / 5.80		138 / 3.90							288	0	DWR
		10-15-59	70	903	8.0	72 / 3.60	26 / 2.15	104 / 4.95	5.9 / 0.152	0 / 0.00	366 / 6.00	34 / 0.70	140 / 3.95	3.7 / 0.06	0.5 / 0.03	0.17	37	613	46	288	0	DWR
Chandler's Palos Verdes Sand and Gravel Co. Ind.	4S/14W-35F2 281C	4-15-59	71	1275	7.5					0 / 0.00	372 / 6.0		177 / 5.00							380	75	DWR
		10-15-59	78	1403	7.4					0 / 0.00	392 / 6.44		183 / 5.15							348	26	Term
Palos Verdes Water Co. Mun.	4S/14W-36H1 301	4-15-59	75	610	7.6					0 / 0.00	326 / 5.35		89 / 2.50							95	0	DWR
		10-19-59	78	788	7.7	22 / 1.10	10 / 0.85	136 / 5.90	7.3 / 0.186	0. / 0.00	339 / 5.55	2.0 / 0.04	89 / 2.50	1.4 / 0.02	0 / 0	0.42	38	469	73	98	0	DWR

a. Gravimetric determination
b. Analysis by Terminal Testing Laboratories Inc. (Term), State Department of Water Resources (DWR) or Los Angeles County Flood Control District (LACFCD) as indicated
c. Na plus K determined together.

ANALYSES OF GROUND WATER
1959

Owner and use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by b
WEST COAST BASIN (4-11 02)																						
TORRANCE AREA																						
Maria N. Ishida Dom. & Irr.	3S/13W-29G3 831	4- 7-59	65	985	7.6	101 / 5.05	9.0 / 0.75	83 / 3.63	4.3 / 0.111	0 / 0.00	259 / 4.25	108 / 2.25	110 / 3.10	2.0 / 0.03	0.4 / 0.02	0.06	27	634	38	290	77	DWR
		10-19-59	--	1145	8.1	107 / 5.32	24 / 1.90	90 / 3.90	5.0 / 0.120	0 / 0.00	311 / 5.10	118 / 2.46	135 / 3.79	0 / 0	0.2 / 0.01	0.14	20	795	35	364	109	Term
H. E. Distel Dom.	3S/13W-31F1 813H	4-15-59	67	1720	7.8					0 / 0.00	323 / 5.30		324 / 9.15							668	403	DWR
		10- 2-59	--	1887	7.7					0 / 0.00	330 / 5.41		326 / 9.18							654	383	Term
So. Calif. Water Co. Mun.	3S/14W-24K14 800	4- 2-59	76	554	8.1					0 / 0.00	220 / 3.60		25 / 0.70							193	13	DWR
		10-27-59	72	589	7.6					0 / 0.00	220 / 3.60		27 / 0.75							198	18	Term
Wilbur Hornstra Dairy Dom. & Irr.	3S/14W-25K4 802	4-15-59	69	563	7.9					0 / 0.00	220 / 3.60		57 / 1.60							185	5	DWR
		10- 2-59	--	631	7.4					0 / 0.00	222 / 3.63		61 / 1.73							206	24	Term
L. A. County Park Dept. Irr.	3S/14W-27C1 761	4-14-59	69	960	8.3					5.0 / 0.15	204 / 3.35		245 / 6.90							358	190	DWR
		10-20-59	69	1139	8.0					0 / 0.00	220 / 3.60		223 / 6.29							369	189	DWR
Moneta Water Co. Mun.	3S/14W-35M5 773K	4-10-59	75	483	8.2	32 / 1.60	14 / 1.15	57 / 2.50	5.6 / 0.142	0 / 0.00	232 / 3.80	13 / 0.27	35 / 1.00	8.4 / 0.14	0.4 / 0.02	0.11	32	307	46	138	0	DWR
		10-22-59	75	506	7.4					0 / 0.00	240 / 3.93		39 / 1.10							139	0	Term

a. Gravimetric determination.
b. Analysis by Departments of Water Resources, (DWR), Terminal Testing Laboratories Inc., (Term) as indicated.

ANALYSES OF GROUND WATER
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ANALYSES OF GROUND WATER

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OWNER AND USE	STATE WELL NUMBER AND OTHER NUMBER	DATE SAMPLED	TEMP IN °F	SPECIFIC CONDUCTANCE (MICROMHOS AT 25°C)	pH	MINERAL CONSTITUENTS IN PARTS PER MILLION / EQUIVALENTS PER MILLION: CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM (Na)	POTASSIUM (K)	CARBONATE (CO_3)	BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	NITRATE (NO_3)	FLUORIDE (F)	BORON (B)	SILICA (SiO_2)	TOTAL DISSOLVED SOLIDS IN PPM [a]	PERCENT SODIUM	HARDNESS as $CaCO_3$: TOTAL PPM	HARDNESS as $CaCO_3$: N C PPM	ANALYZED BY [b]
CENTRAL BASIN PRESSURE AREA (4-11.03)																						
City of South Gate Mun.	3S/13W-2B1 1495B	4- 3-59		895	8.0	100 / 5.00	25 / 2.05	51 / 2.20	3.5 / 0.090	0 / 0.00	259 / 4.25	156 / 3.25	67 / 1.90	2.4 / 0.04	0.4 / 0.02	0.08	26	553	24	353	140	DWR
		12-16-59	64	901	7.5					0 / 0.00	263 / 4.31		73 / 2.04							356	140	Term

a. Gravimetric Determination
b. Analysis by Terminal Testing Laboratories Inc. (Term) or State Department of Water Resources (DWR) as indicated

ANALYSES OF GROUND WATER

1959

Owner and Use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by b
LOS ANGELES FOREBAY AREA (4-11.04)																						
City of Vernon Mun.	2S/13W-10P4 2769G	5- 5-59	66	668						0 0.00	232 3.80		34 0.96							232		Term
		12-22-59	66	695						0 0.00	250 4.10		34 0.96							261		DWR
City of Vernon Mun.	2S/13W-14H1 1490E	12-22-59	66	621	7.5					0 0.00	234 3.84		29 0.82							224	32	DWR
Pioneer Paper Co. Ind.	2S/13W-15N3 1460D	5- 5-59		634	7.6	68 3.41	17 1.41	41 1.81	3.8 0.090	0 0.00	232 3.82	93 1.95	33 0.92	0.6 0.01	0.6 0.03	0	20	466	27	241	50	Term
		12-22-59	65	655	7.7					0 0.00	238 3.90		30 0.85							245	50	DWR

a. Gravimetric determination
b. Analysis by Department of Water Resources (DWR) or Terminal Testing Laboratories Inc. (Term) is indicated

ANALYSES OF GROUND WATER

1959

Owner and Use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by [b]
MAIN SAN GABRIEL BASIN (4-13.01)																						
Baldwin Park County Water District Dom. & Irr.	1S/10W-7A1 4239A	5- 1-59		613	7.6					0 0.00	196 3.21		67 1.89							277	116	Term
		12-17-59		696	7.6	91 4.55	20 1.62	12 0.52	3.9 0.100	0 0.00	207 3.39	47 0.97	84 2.37	12 0.20	0.2 0.01	0	15	482	8	309	139	Term
City of Glendora Mun. & Irr.	1S/10W-10C1 4289	12-17-59	66	632						0 0.00	235 3.95		16 0.45							278		DWR
Walnut Place Mutual Water Co. Dom. & Irr.	1S/10W-19N1 3023M	5- 1-59		990	7.8	106 5.30	27 2.20	69 3.00	6.1 0.157	0 0.00	232 3.80	173 3.60	67 1.90	79 1.27	0.2 0.01	0.16	18	679	28	375	185	DWR
		12-17-59		1093	7.2					0 0.00	251 4.11		80 2.24							363	157	Term
Southern California Water Co. Mun.	1S/11W-10F1	5- 1-59	62	409	8.2					0 0.00	201 3.30		9.0 0.25							165	0	Term
		12-17-59	60	418	7.6					0 0.00	208 3.41		12 0.32							183	12	Term
San Gabriel Valley Water Co. Mun. & Ind.	1S/11W-26K1	5- 1-59		608	7.8	80 3.98	16 1.33	19 0.86	3.9 0.100	0 0.00	211 3.47	79 1.65	33 0.92	10 0.16	0.3 0.02	0.23	20	437	14	265	91	Term
		12-17-59	65	825	7.9	104 5.21	24 1.97	23 1.02	4.9 0.130	0 0.00	204 3.35	139 2.89	61 1.72	19 0.29	0.3 0.02	0	16	575	12	359	191	Term
Pedro Mireles Irr. & Dom.	1S/11W-32C1	5- 1-59		724	7.4						260 5.42		28 0.77							321	50	Term
		8-25-59		736	7.4					0 0.00	307 5.04		31 0.86							338	86	Term
		12-16-59		798	7.6					0 0.00	329 5.40		33 0.92							368	98	Term
Ed Alluis Dom. & Irr.	1S/11W-33P1 2956D	5- 1-59		785	7.6	113 5.66	27 2.16	21 0.90	5.1 0.130	0 0.00	301 4.93	119 2.48	36 1.01	10 0.17	0 0	0.18	20	591	10	391	26	Term

ANALYSES OF GROUND WATER
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Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by b
MAIN SAN GABRIEL BASIN (4-13.01) (Continued)																						
Ed Alluis Dom. & Irr.	1S/11W-33P1 2956D	6-22-59		782	7.4	121 / 6.05	21 / 1.75	20 / 0.86	4.7 / 0.120	0 / 0.00	305 / 5.00	115 / 2.40	39 / 1.10	14 / 0.22	0.1 / 0.01	0.03	21	517	10	390	140	DWR
		12-16-59		873	7.8					0 / 0.00	324 / 5.30		34 / 0.94							416	151	Term

a. Gravimetric determination
b. Analysis by Department of Water Resources (DWR) or Terminal Testing Laboratories Inc. (Term) as indicated.

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ANALYSES OF GROUND WATER

1959

Owner and use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by b
LOWER MOJAVE RIVER VALLEY (6-40) BARSTOW TO YERMO																						
Union Pacific R.R. Mun. & Ind.	9N/1E-1M1	3-24-59	71	455	7.6	37 / 1.85	6.0 / 0.53	48 / 2.10	1.5 / 0.040	0 / 0.00	182 / 2.98	31 / 0.64	28 / 0.80	2.0 / 0.03	0.8 / 0.04	0.53	21	326	46	119	0	Term
		5-27-59	--	444	7.5	39 / 1.95	6.0 / 0.49	50 / 2.17	1.7 / 0.043	0 / 0.00	188 / 3.08	33 / 0.69	29 / 0.82	2.7 / 0.04	0.6 / 0.03	0.13		259	47	123	0	SBCFCD
		11- 2-59	--	456	7.5					0 / 0.00	190 / 3.11		32 / 0.90							124	0	Term
California Electric Power Co. Irr.	9N/1E-14M1	4- 6-59	68	958	7.3	85 / 4.24	18 / 1.52	94 / 4.09	3.5 / 0.090	0 / 0.00	298 / 4.88	140 / 2.92	77 / 2.17	13.6 / 0.22	0.5 / 0.03	0.58	25	620	41	288	44	DWR
Grey Phelps Dom. & Irr.	9N/1E-15N2	3-24-59	68	890	7.0	78 / 3.91	13 / 1.10	93 / 4.03	3.1 / 0.080	0 / 0.00	273 / 4.49	118 / 2.46	81 / 2.30	3.0 / 0.05	0.4 / 0.02	0.62	27	648	44	250	25	Term
		5-27-59	--	886	7.4	80 / 3.99	14 / 1.15	94 / 4.09	2.9 / 0.074	0 / 0.00	278 / 4.56	117 / 2.44	78 / 2.20	3.8 / 0.06	0.5 / 0.03	0.33		541	44	254	26	SBCFCD
		11- 2-59	64	882	7.2					0 / 0.00	270 / 4.43		81 / 2.27							251	29	Term
Stuart C. Slack Dom. & Irr.	9N/2E- 8N2	4- 8-59	69	525	7.6	49 / 2.45	9.0 / 0.74	52 / 2.26	1.2 / 0.031	0 / 0.00	205 / 3.36	48 / 1.01	35 / 0.99	4.0 / 0.07	0.6 / 0.03	0.14	25	320	41	156	0	DWR
		5-27-59	--	468	7.4	45 / 2.25	6.0 / 0.49	53 / 2.30	1.1 / 0.028	0 / 0.00	195 / 3.20	42 / 0.87	30 / 0.85	2.7 / 0.04	0.5 / 0.03	0.13		272	45	138	0	SBCFCD
		11- 2-59	66	468	7.1	43 / 2.16	7.0 / 0.59	49 / 2.15	1.6 / 0.040	0 / 0.00	197 / 3.24	41 / 0.86	30 / 0.84	1.0 / 0.02	0.7	0.08	23	350	44	138	0	Term
Southern California Water Co. Mun.	9N/1W-5J2	3-24-59	74	1760	7.8					0 / 0.00	215 / 3.51		216 / 6.08							245	69	Term
		4- 9-59	--	--	7.7	82 / 4.10	12 / 1.00	296 / 12.88	4.0 / 0.100	0 / 0.00	212 / 3.48	394 / 8.20	228 / 6.42	14.2 / 0.23	2.8 / 0.15			1240	71	255	81	BSE
		6-59	--	1835	7.5	85 / 4.24	11 / 0.90	305 / 13.26	8.5 / 0.218	0 / 0.00	215 / 3.52	379 / 7.89	227 / 6.40	16.2 / 0.26	3.0 / 0.16	3.60		1193	71	254	78	SBCFCD

ANALYSES OF GROUND WATER
1959

Owner and use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by b
LOWER MOJAVE RIVER VALLEY (6-40)(Continued) BARSTOW TO YERMO																						
Southern California Water Co. Mun.	9N/1W-5J3	11-3-59	62	1886	7.8	20 / 1.02	44 / 3.64	317 / 13.80	6.0 / 0.140	0 / 0.00	173 / 2.84	423 / 8.81	261 / 7.35	0 / 0	3.5 / 0.18	2.50	12	1285	74	233	91	Term
J. B. Price Dom.	9N/1W-9G1	3-24-59	--	1110	7.4	107 / 5.36	13 / 1.09	116 / 5.03	3.5 / 0.090	0 / 0.00	461 / 7.55	82 / 1.70	90 / 2.55	1.0 / 0.01	0.9 / 0.05	1.40	26	841	43	322	0	Term
		5-26-59	--	1361	7.2	112 / 5.59	24 / 1.97	113 / 4.91	3.0 / 0.077	0 / 0.00	483 / 7.92	84 / 1.75	94 / 2.65	0 / 0	0.8 / 0.04	1.50		722	39	374	0	SBCFCD
		11-3-59	--	1166	7.3					0 / 0.00	495 / 8.12		99 / 2.79							347	0	Term
ERCO Dom., Irr. & Stock	9N/1W-10D2	3-24-59	--	566	7.7	48 / 2.40	8.0 / 0.68	61 / 2.66	2.8 / 0.070	0 / 0.00	199 / 3.26	65 / 1.36	36 / 1.03	1.0 / 0.01	0.7 / 0.04	0.18	23	404	46	154	0	Term
		7-31-59	--	597	7.6	50 / 2.50	11 / 0.89	64 / 2.80	2.7 / 0.070	0 / 0.00	199 / 3.26	82 / 1.70	41 / 1.15	1.0 / 0.02	0.9 / 0.04	0.20	24	434	45	170	7.0	Term
		11-3-59	64	547	7.4					0 / 0.00	196 / 3.22		37 / 1.03							155		Term
Lee Tippet Dom.	9N/1W-10G1	3-26-59	--	1610	7.8					0 / 0.00	429 / 7.03		100 / 2.81							413	61	Term
		5-27-59	--	1409	7.7	118 / 5.89	21 / 1.73	175 / 7.61	4.1 / 0.105	7.0 / 0.24	398 / 6.52	293 / 6.10	86 / 2.43	0.6 / 0.01	0.6 / 0.03	0.32		914	50	378	52	SBCFCD
		7-31-59	--	1326	7.2	104 / 5.18	26 / 2.10	161 / 7.00	3.9 / 0.100	0 / 0.00	396 / 6.50	281 / 5.84	83 / 2.32	0 / 0	0.9 / 0.05	0.38	24	991	49	364	39	Term
		11-3-59	--	1368	7.3					0 / 0	411 / 6.73		85 / 2.38							340	3.0	Term
Cool Water Ranch Irr.	9N/1W-13H2	5-7-59	--		8.7	52 / 2.60	11 / 0.90	78 / 3.40	2.2 / 0.050	7.0 / 0.24	185 / 3.04	94 / 1.96	59 / 1.65	1.24 / 0.02	0.6 / 0.03			440	49	176	24	BSE
		9-9-59	66	691	7.5	53 / 2.64	11 / 0.90	78 / 3.39	2.4 / 0.061	0 / 0.00	203 / 3.32	95 / 1.98	60 / 1.69	1.5 / 0.02	0.6 / 0.03	0.32	20	440	48	178	12	DWR

ANALYSES OF GROUND WATER

1959

Owner and use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by b
LOWER MOJAVE RIVER VALLEY (6-40) (Continued)																						
BARSTOW TO YERMO																						
Cool Water Ranch Irr.	9N/1W-13H2	11- 2-59	65	725	7.0					0 0.00	200 3.29		70 1.96							180	15	Term
Southern California Water Co. Mun.	9N/2W-1F1	5-26-59	--	1217	7.4	98 4.89	17 1.40	141 6.13	3.0 0.077	0 0.00	232 3.80	247 5.14	113 3.19	15.0 0.24	0.9 0.05	0.74		789	49	320	130	SBCFCD
R. W. Dickerson Dom. & Irr.	10N/1W-32J1	3-24-59	--	652	7.7					0 0.00	216 3.53		45 1.27							186	9.0	Term
		4- 9-59	--	--	7.6	58 2.90	8.5 0.68	74 3.20	2.0 0.050	0 0.00	228 3.74	90 1.88	42 1.18	0.7 0.01	0.6 0.03			505	47	180	0	BSE
		5-26-59	--	1003	7.7	64 3.19	13 1.07	144 6.26	2.7 0.069	0 0.00	278 4.56	130 2.71	94 2.65	15.0 0.24	0.9 0.05	0.35		603	59	211	0	SBCFCD
State Dept. of Agriculture Dom	10N/2E-31R1	3-24-59	--	457	7.5	35 1.73	5.0 0.44	62 2.70	1.0 0.030	0 0.00	187 3.07	47 0.98	35 0.99	1.0 0.02	0.8 0.04	0.98	27	344	55	108	0	Term
		5-27-59	--	483	7.5	37 1.85	5.0 0.41	64 2.78	0.9 0.023	0 0.00	181 2.96	47 0.98	36 1.02	1.1 0.02	0.5 0.03	0.31		279	55	112	0	SBCFCD

a. Gravimetric determination.
b. Analysis by Department of Water Resources (DWR), or Terminal Testing Laboratories, Inc. (Term) San Bernardino County Flood Control District (SBCFCD) or State Department of Public Health, Bureau of Sanitary Engineering (BSE) as indicated.

ANALYSES OF GROUND WATER

1959

OWNER AND USE	STATE WELL NUMBER AND OTHER NUMBER	DATE SAMPLED	TEMP. IN °F	SPECIFIC CONDUCTANCE (MICROMHOS AT 25°C)	pH	MINERAL CONSTITUENTS IN PARTS PER MILLION / EQUIVALENTS PER MILLION: CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM (Na)	POTASSIUM (K)	CARBONATE (CO_3)	BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	NITRATE (NO_3)	FLUORIDE (F)	BORON (B)	SILICA (SiO_2)	TOTAL DISSOLVED SOLIDS IN PPM [a]	PERCENT SODIUM	HARDNESS as $CaCO_3$: TOTAL PPM	HARDNESS as $CaCO_3$: NC PPM	ANALYZED BY [b]
						COACHELLA VALLEY (7-21)																
Lester Roberson Dom.	5S/7E-16K1	5- 5-59		323	7.8					0 / 0.00	144 / 2.36		10 / 0.28							113	0	Term
		12-15-59		307	8.2	34 / 1.70	6.0 / 0.50	20 / 0.88	4.3 / 0.110	0 / 0.00	149 / 2.45	17 / 0.36	7.0 / 0.20	2.9 / 0.05	1.0 / 0.05	0.05	24	176	28	110	0	DWR
Z. E. Zalay Dom.	5S/7E-22K1	5- 5-59	74	972	7.7					0 / 0.00	184 / 3.01		78 / 2.20							391	240	Term
		12-15-59		773	7.4	95 / 4.74	16 / 1.33	32 / 1.42	5.0 / 0.130	0 / 0.00	155 / 2.55	156 / 3.24	67 / 1.89	4.0 / 0.06	0.5	0	23	535	19	304	176	Term
Joe N. Ramirez & Sons Dom. & Irr.	5S/7E-33C1	5- 5-59		1129	7.9	147 / 7.37	20 / 1.66	60 / 2.60	6.6 / 0.170	0 / 0.00	155 / 2.54	249 / 5.19	92 / 2.60	93 / 1.50	0 / 0	0.09	24	806	22	452	325	Term
		12-15-59	70	1449	7.3	186 / 9.28	24 / 1.95	79 / 3.44	7.0 / 0.170	0 / 0.00	171 / 2.80	333 / 6.94	124 / 3.49	93 / 1.49	0.2	0	23	1015	23	562	422	Term
Mitchell Land and Improvement Co. Dom.	5S/8E-31D1	5- 5-59		641	7.9	80 / 4.00	6.0 / 0.45	41 / 1.77	5.0 / 0.130	0 / 0.00	146 / 2.40	118 / 2.46	54 / 1.52	7.0 / 0.12	0.4		17	453	28	223	103	Term
		12-15-59		550	8.1	67 / 3.35	5.0 / 0.40	36 / 1.58	5.2 / 0.134	0 / 0.00	143 / 2.35	97 / 2.01	39 / 1.10	8.1 / 0.13	0.5 / 0.03	0	27	355	29	188	70	DWR
E. M. Holm Dom.	5S/8E-33N1	12-16-59		587	8.2	29 / 1.45	0 / 0	92 / 4.00	4.2 / 0.107	0 / 0.00	137 / 2.25	123 / 2.57	23 / 0.65	0.3 / 0.005	3.9 / 0.20	0.11	23	346	72	73	0	DWR
Gifford Phillips Dom.	6S/7E-25E1	5- 6-59		724	7.9	64 / 3.20	3.0 / 0.26	76 / 3.28	4.0 / 0.110	0 / 0.00	98 / 1.60	130 / 2.70	85 / 2.39	37 / 0.62	0.8 / 0.04	0.18	20	485	48	173	93	Term
M. R. Shepard Dom.	6S/8E-7P1	5- 6-59		466	8.0					0 / 0.00	97 / 2.03		45 / 1.27							156	54	Term
		12-16-59		546	7.9	56 / 2.80	6.0 / 0.45	34 / 1.50	4.0 / 0.090	0 / 0.00	128 / 2.09	51 / 1.07	51 / 1.44	2.0 / 0.04	0.5 / 0.03	0	18	355	31	163	58	Term
E. H. McCain Dom. & Irr.	6S/8E-10A3	5- 6-59		487	8.2					0 / 0.00	97 / 1.59		42 / 1.18							65	0	Term

ANALYSES OF GROUND WATER

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OWNER AND USE	STATE WELL NUMBER AND OTHER NUMBER	DATE SAMPLED	TEMP. IN °F	SPECIFIC CONDUCTANCE (MICROMHOS AT 25°C)	pH	MINERAL CONSTITUENTS IN PARTS PER MILLION / EQUIVALENTS PER MILLION: CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM (Na)	POTASSIUM (K)	CARBONATE (CO_3)	BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	NITRATE (NO_3)	FLUORIDE (F)	BORON (B)	SILICA (SiO_2)	TOTAL DISSOLVED SOLIDS IN PPM [a]	PERCENT SODIUM	HARDNESS as $CaCO_3$: TOTAL PPM	HARDNESS as $CaCO_3$: NC PPM	ANALYZED BY [b]
COACHELLA VALLEY (7-21) (Continued)																						
E. H. McCain (continued) Dom. & Irr.	6S/8E-10A3	12-15-59		457	8.2	21 1.05	1.0 0.05	71 3.10	3.5 0.090	0 0.00	95 1.55	67 1.38	34 0.95	0.9 0.02	5.7 0.30	0.28	22	267	72	55	0	DWR
W. C. & Joe E. Stroube Dom.	6S/8E-27H1	5- 6-59		243	8.4					4.0 0.12	77 1.26		14 0.37							36	0	Term
		12-16-59		225	8.5	13 0.65	1.0 0.05	35 1.51	2.6 0.066	6.0 0.20	73 1.20	27 0.56	9 0.25	0.4 0.007	0.6 0.034	0.02	21	142	66	35	0	DWR
Nazenig Karahadian Ranch Dom. & Irr.	6S/9E-30C1	5- 6-59		280	8.2					0 0.00	84 1.38		13 0.35							19	0	Term
		12-16-59	71	272	8.3	7.0 0.35	2.0 0.20	52 2.25	1.3 0.033	6.0 0.20	73 1.20	39 0.81	11 0.30	0.5 0.01	1.9 0.10	0.06	16	157	80	28	0	DWR
Vessey Brothers Dom.	7S/8E-22M1	5- 6-59		1258	8.3	76 3.80	3.0 0.26	151 6.54	4.2 0.110	0 0.00	21 0.35	158 3.29	260 7.32	4.0 0.07	0.7 0.04	0.34	12	779	61	203	185	Term
		12-16-59		1550	7.8	107 5.35	5.0 0.45	192 8.35	5.9 0.150	0 0.00	31 0.50	214 4.45	328 9.25	10 0.16	0.6 0.03	0.02	13	984	58	290	255	DWR
C. Charles Crockett Dom. & Irr.	7S/9E-16K1	5- 6-59		1129	8.5	17 0.85	5.0 0.36	221 9.57	2.7 0.07	14 0.46	240 3.94	181 3.77	96 2.70	2.0 0.04	6.4 0.34	0.45	17	785	88	61	0	Term
		12-16-59		1320	8.4	24 1.20	5.0 0.45	253 11.0	19 0.490	9.0 0.30	262 4.30	217 4.48	121 3.40	2.7 0.04	5.7 0.30	0.47	18	788	84	83	0	DWR

a. Gravimetric determination.
b. Analysis by Department of Water Resources (DWR) or Terminal Testing Laboratories, Inc. (Term) as indicated.

ANALYSES OF GROUND WATER

1959

Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (No)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by [b]
						ANAHEIM BASIN PRESSURE AREA (8-1.01)																
M. Mullens Dom.	5S/11W-20Q5	5-18-59		1051	7.8	114 5.67	21 1.71	55 2.38	4 0.100	0 0.00	159 2.61	44 0.91	222 6.25	0 0	0.6	0.12	25	677	24	369	238	Term
		10-30-59		2933	7.9	355 17.71	63 5.18	129 5.61	8.0 0.205	0 0.00	131 2.16	101 2.10	840 23.69	2.0 0.03	0.2 0.01	0.10	20	1900	20	1145	1037	DWR
C. C. Stedman Dom.	5S/11W-21M3	4-20-59		370	8.0					5.0 0.17	154 2.52	33 0.69	8.0 0.23									OCDA
		9-25-59		376	8.3					4.0 0.13	153 2.51	34 0.71	6.0 0.17									OCDA
Anderson Mutual Water Co. Dom.	5S/11W-21N2	4-13-59		549	7.8	58 2.90	10 0.83	58 2.52	3.4 0.090	0 0.00	187 3.07	156 3.25	19 0.52			0		340	40	187	33	OCDA
		9-25-59		598	8.2					0 0.00	184 3.02	150 3.13	20 0.56									OCDA
Harry C. Fulton Dom.	5S/11W-25R2	4-17-59		770	7.9	104 5.20	22 1.83	23 1.00	7.0 0.180	0 0.00	321 5.26	80 1.67	41 1.16					460	12	352	89	OCDA
		9-4-59		816	7.7					0 0.00	345 5.66	83 1.73	38 1.07									OCDA
W. S. Tubach Dom.	5S/11W-27H4	4-20-59		2234	7.7					0 0.00	287 4.70	206 4.29	465 13.1									OCDA
Callens Brothers Irr.	5S/11W-28H2	3-5-59		425	7.7	42 2.10	8.0 0.67	38 1.65	4.0 0.100	0 0.00	200 3.28	22 0.46	17 0.48			0.45		280	43	139	0	OCDA
		9-25-59		432	7.8					0 0.00	189 3.10	26 0.54	19 0.54									OCDA
Bolsa Land Co. duck pond	5S/11W-28K1	9-25-59		526	8.5					19 0.64	255 4.18	0.20	12 0.34									OCDA
Sunset Land and Water Co. Mun.	5S/11W-29C1	4-20-59		323	8.2					7.0 0.23	146 2.39	9.0 0.19	16 0.45									OCDA

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ANALYSES OF GROUND WATER

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Owner and use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by [b]
ANAHEIM BASIN PRESSURE AREA (8-1.01) (Continued)																						
Sunset Land and Water Co.	5S/11W-29C1	10-2-59		3854	8.2	66 / 3.30	51 / 4.25	470 / 20.43	4.0 / 0.100	7.0 / 0.23	112 / 2.33	110 / 2.29	805 / 22.70	0 / 0	0.5 / 0.03	0		1746	73	378	261	OCDA
Signal Oil and Gas Co. Ind.	5S/11W-33H1	4-21-59		351	8.2					7.0 / 0.23	188 / 3.08	3.0 / 0.06	12 / 0.34									OCDA
		10-28-59		363	8.4					7.0 / 0.23	176 / 2.89	3.0 / 0.06	13 / 0.37									OCDA
Signal Oil and Gas Co. Ind.	5S/11W-34F3	4-21-59		639	8.3					12 / 0.40	373 / 6.11	2.0 / 0.04	16 / 0.45									OCDA
		10-28-59		656	8.4					12 / 0.40	350 / 5.74	0.70 / 0.01	18 / 0.51									OCDA
Joseph J. Courreges Dom.	5S/11W-36B2	9-4-59		470	8.0					0 / 0.00	207 / 3.39	43 / 0.90	19 / 0.54									OCDA
Ivan Harper Irr. & Dom.	5S/11W-36P1	4-21-59		1588	7.8	192 / 9.60	29 / 2.42	69 / 3.00	10 / 0.260	0 / 0.00	210 / 3.44	51 / 1.06	375 / 10.58			0.80		1017	20	601	429	OCDA
		9-3-59		1882	7.4	182 / 9.10	47 / 3.92	118 / 5.13	20 / 0.510	0 / 0.00	217 / 3.56	101 / 2.10	434 / 12.24	30 / 0.42	0.4 / 0.02			1260	27	651	473	OCDA
I. W. Hellman Ranch Dom. & Stk	5S/12W-12C1	10-28-59		323	8.6					6.0 / 0.20	134 / 2.20	14 / 0.29	10 / 0.28									OCDA
Robert Gisler Irr.	6S/10W-5C1	3-16-59		701	7.5					0 / 0.00	268 / 4.39	82 / 1.70	35 / 0.99									OCDA
		9-18-59		747	7.5					0 / 0.00	288 / 4.72	81 / 1.69	30 / 0.94									OCDA
Marshburn Farms Irr. & Ind.	6S/10W-5M1	2-27-59		635	7.8	62 / 3.10	17 / 1.42	50 / 2.17	8.6 / 0.220	0 / 0.00	268 / 4.39	66 / 1.38	30 / 0.85					323	31	226	6	OCDA

ANALYSES OF GROUND WATER

1959

Owner and use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by [b]
ANAHEIM BASIN PRESSURE AREA (8-1.01) (Continued)																						
Marshburn Farms Irr. & Ind.	6S/10W-5M1	9-4-59		617	7.7					0 / 0.00	254 / 4.16	71 / 1.48	34 / 0.96									OCDA
William Lamb Dom.	6S/10W-6B2	4-23-59		484	7.8	51 / 2.55	9.0 / 0.75	40 / 1.74	4.3 / 0.110	0 / 0.00	229 / 3.75	46 / 0.96	17 / 0.48					318	33	165	0	OCDA
		11-4-59		484	7.7					0 / 0.00	215 / 3.52	44 / 0.92	17 / 0.48									OCDA
Walter Lamb Irr	6S/10W-6H2	3-6-59		508	7.9					0 / 0.00	243 / 3.98	41 / 0.85	17 / 0.48									OCDA
H. J. Lamb Dom.	6S/10W-6L2	2-27-59		9076	7.3	461 / 48.05	85 / 7.05	800 / 34.78	36 / 0.920	0 / 0.00	331 / 5.43	0.2 /	3021 / 85.19			0		5910	38	2755	2483	OCDA
		9-3-59		9774	6.8					0 / 0.00	364 / 5.97	2.0 / 0.04	3223 / 90.89									OCDA
Jim Bushard Dom.	6S/10W-7D3	2-27-59		7586	7.3	779 / 38.85	114 / 9.40	580 / 25.22	36 / 0.920	0 / 0.00	337 / 5.52	2.0 / 0.04	2431 / 68.56					5242	34	2413	2137	OCDA
		9-18-59		8332	7.1					0 / 0.00	342 / 5.61	1.0 / 0.02	2707 / 76.40									OCDA
Alban Holtz Dom.	6S/10W-7G1	2-27-59		7158	6.1	760 / 38.00	130 / 10.83	450 / 19.57	34 / 0.870	0 / 0.00	10 / 0.16	0.7 / 0.02	2425 / 68.39					4864	28	2442	2434	OCDA
E. H. Geisler Dom.	6S/10W-18B4	4-13-59		5350	7.5					0 / 0.00	236 / 4.52	8.0 / 0.17	1543 / 43.51									OCDA
		9-25-59		5711	7.5	375 / 18.75	63 / 5.25	700 / 30.43	30 / 0.770	0 / 0.00	277 / 4.54	0.8 / 0.02	1777 / 50.11	0	0.4 / 0.02	0.5		3620	55	1200	973	OCDA
Anaheim Sugar Co. Irr.	6S/11W-1B1	4-21-59		794	7.9	94 / 4.85	18 / 1.50	43 / 1.87	7.6 / 0.190	0 / 0.00	227 / 3.72	76 / 1.58	93 / 2.62			0.60		513	22	318	132	OCDA
Urban Plavan Irr.	6S/11W-1J3	3-3-59		2747	7.6	335 / 16.75	55 / 4.58	120 / 5.22	7.2 / 0.180	0 / 0.00	189 / 3.10	95 / 1.99	764 / 21.55					1430	22	1067	912	OCDA

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ANALYSES OF GROUND WATER

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Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micramhos at 25° C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by [b]
ANAHEIM BASIN PRESSURE AREA (8-1.01) (Continued)																						
Urban Plavan Irr.	6S/11W-1J3	10-2-59		4235	7.4	527 26.35	87 7.25	144 6.26	19 0.490	0 0.00	163 2.67	13 2.69	1267 35.73	0	0.1			3025	15	1680	1546	OCDA
Huntington Beach Golf Course Irr.	6S/11W-3R2	4-27-59		1141	7.8	37 1.85	11 0.90	188 8.17	5.4 0.130	0 0.00	344 5.64	0.2	201 5.67			0.10		699	74	138	0	OCDA
		10-2-59		384	7.7	8.0 0.40	1.8 0.15	69 3.00	3.4 0.090	0 0.00	167 2.74	9.0 0.19	25 0.71	0	0.5 0.02			222	82	28	0	OCDA
Wilshire Oil Co. Ind.	6S/11W-13F4	4-23-59		11408	7.7	302 15.10	211 17.55	1960 85.22	100 2.560	0 0.00	268 4.39	337 7.02	3840 108.29			0.60		7902	71	1633	1413	OCDA
		10-9-59		9774	7.5	488 24.30	235 19.6	1180 51.30	85 2.180	0 0.00	203 3.33	214 4.46	3195 90.10	0	0.3			7128	53	2194	2027	OCDA

a. Gravimetric determination.
b. Analyzed by: Orange County Department of Agriculture Laboratory (OCDA).

ANALYSES OF GROUND WATER

1959

Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by b
						CHINO BASIN (8-2.01)																
S & S Ranch Dom & Irr.	1S/6W-29R1	7-8-59		415	7.6	59 2.94	4.0 0.33	22 0.96	2.0 0.051	0 0.00	195 3.20	4.0 0.08	25 0.71	18 0.28	0.2 0.01	0.0		258	22	161	1	SBCFCD
		12-17-59		420	7.7	54 2.69	6.0 0.49	23 1.00	1.8 0.046	0 0.00	193 3.16	11 0.23	23 0.65	16 0.26	0.1 0.01	0.0		240	24	159	1	SBCFCD
Peach Park Water Co. Dom. & Irr.	1S/7W-28R1	3-26-59		360	7.6	36 1.80	17 1.40	15 0.65	1.4 0.036	0 0.00	176 2.88	67 0.14	13 0.36	14 0.22	0.3 0.02	0.0		242	17	158	14	SBCFCD
		7-8-59		359	7.4	45 2.25	12 0.99	16 0.70	1.2 0.031	0 0.00	183 3.00	12 0.25	13 0.37	14 0.22	0.4 0.02	0.0		240	18	159	9	SBCFCD
		12-17-59		370	7.6	47 2.35	9.0 0.74	16 0.70	0.9 0.023	0 0.00	178 2.92	18 0.37	10 0.28	13 0.20	0.3 0.02	0.0		214	18	155	9	SBCFCD
Wilder and Camel Dom.	1S/7W-34M1	3-13-59		424	7.7	53 2.64	11 0.90	18 0.78	1.4 0.036	0 0.00	198 3.24	12 0.24	17 0.48	18 0.29	0.4 0.02	0.0	35	275	18	178	16	SBCFCD
		7-8-59		396	7.4	50 2.50	13 1.07	18 0.78	1.3 0.033	0 0.00	200 3.28	9.0 0.19	15 0.42	18 0.29	0.4 0.02	0.01		262	18	174	10	SBCFCD
		9-21-59		402	7.8	48 2.40	12 1.00	16 0.71	1.4 0.035	0 0.00	192 3.15	6.0 0.12	18 0.50	19 0.31	0.3 0.02	0.02	32	217	17	170	12	DWR
P. J. Crevolin Dom. & Irr.	2S/7W-10M1	3-26-59		520	7.6	55 2.74	24 1.97	22 0.96	1.7 0.044	0 0.00	203 3.32	23 0.47	34 0.96	45 0.73	0.2 0.01	0.0		322	17	233	67	SBCFCD
		8-11-59		598	7.8	70 3.49	21 1.73	20 0.87	1.7 0.044	0 0.00	232 3.80	24 0.50	37 1.04	43 0.69	0.3 0.02	0.01		356	14	261	71	SBCFCD
		11-20-59		636	7.5	76 3.79	21 1.73	15 0.65	1.8 0.046	0 0.00	229 3.76	26 0.54	41 1.16	41 0.67	0.2 0.01	0.0		419	11	274	86	SBCFCD
Pietro and Domenico Enrico Dom.	2S/7W-15A1	1-27-59		362	7.2	40 2.01	10 0.80	19 0.84	1.5 0.04	0 0.00	190 3.12	9.0 0.18	8.0 0.22	4.0 0.06	0.1 0.01	0.0	22	274	22	140	0	Term
		3-26-59		344	7.6	37 1.85	12 0.99	19 0.83	1.8 0.046	0 0.00	188 3.08	14 0.29	9.0 0.25	4.5 0.07	0.1 0.01	0.0		218	22	141	0	SBCFCD

ANALYSES OF GROUND WATER

1959

Owner and use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by b
						CHINO BASIN (8-2.01) (Continued)																
Pietro and Domenico Enrico Dom. (continued)	2S/7W-15A1	8-11-59		343	7.5	42 / 2.10	9.0 / 0.74	17 / 0.74	1.9 / 0.049	0 / 0.00	190 / 3.12	13 / 0.27	6.0 / 0.17	3.4 / 0.06	0.2 / 0.01	0.01		207	20	143	0	SBCFCD
		11-19-59		342	7.8	40 / 2.00	10 / 0.82	15 / 0.65	1.7 / 0.043	0 / 0.00	190 / 3.12	9.0 / 0.19	5.0 / 0.14	4.0 / 0.07	0.1 / 0.01	0.0		210	19	138	0	SBCFCD
C. T. Merrill Dom. & Irr.	2S/7W-21L1	3-26-59		796	7.5	99 / 4.92	27 / 2.24	32 / 1.39	3.0 / 0.077	0 / 0.00	325 / 5.32	52 / 1.09	33 / 0.94	64 / 1.03	0.2 / 0.01	0.0		567	16	359	93	SBCFCD
		11-19-59		755	8.1	95 / 4.74	26 / 2.14	30 / 1.30	1.9 / 0.049	0 / 0.00	310 / 5.08	46 / 0.96	28 / 0.79	69 / 1.11	0.2 / 0.01	0.0		481	16	342	88	SBCFCD
A. Omlin Dom.	2S/7W-23E1	3-26-59		801	7.4	99 / 4.92	31 / 2.56	28 / 1.22	2.4 / 0.061	0 / 0.00	354 / 5.80	43 / 0.86	39 / 1.10	41 / 0.66	0.2 / 0.01	0.0		491	14	374	84	SBCFCD
		8-11-59		819	7.7	105 / 5.24	29 / 2.38	27 / 1.17	2.2 / 0.056	0 / 0.00	361 / 5.92	39 / 0.81	37 / 1.04	42 / 0.68	0.2 / 0.01	0.0		533	13	381	85	SBCFCD
		11-19-59		775	7.4	101 / 5.04	25 / 2.06	22 / 0.96	2.1 / 0.054	0 / 0.00	334 / 5.48	37 / 0.77	34 / 0.96	45 / 0.72	0.2 / 0.01	0.0		482	12	352	78	SBCFCD
Luginbill and Imbach Dom.	2S/7W-27A1	3-26-59		1060	7.4	129 / 6.46	38 / 3.13	56 / 2.44	2.2 / 0.056	0 / 0.00	599 / 8.68	53 / 1.10	54 / 1.51	34 / 0.54	0.1 / 0.01	0.0		656	20	480	46	SBCFCD
		5-19-59		1106	7.4	104 / 5.20	57 / 4.70	53 / 2.32	2.0 / 0.060	0 / 0.00	518 / 8.50	59 / 1.22	62 / 1.76	31 / 0.50	0.1	0.19		830	19	495	70	Term
		8-11-59		1090	7.7	142 / 7.09	37 / 3.04	48 / 2.09	2.4 / 0.061	0 / 0.00	532 / 8.72	54 / 1.12	53 / 1.49	39 / 0.63	0.1 / 0.01	0.04		690	17	503	67	SBCFCD
		11-19-59		1074	7.5	136 / 6.79	32 / 2.63	58 / 2.52	2.0 / 0.051	0 / 0.00	515 / 8.44	54 / 1.12	52 / 1.47	42 / 0.67	0.1 / 0.01	0.0		657	21	472	50	SBCFCD
		12-29-59		998	7.6					0 / 0.00	508 / 8.33		54 / 1.51							442	25	Term

a. Gravimetric determination.
b. Analysis by San Bernardino County Flood Control District (SBCFCD), Terminal Testing Laboratories Inc. (Term) or State Department of Water Resources (DWR) as indicated.

ANALYSES OF GROUND WATER

1959

Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by [b]
BUNKER HILL BASIN (8-2.06)																						
Delman Water Co. Dom.	1N/4W-29E1	3-12-59		728	7.6	110 / 5.49	22 / 1.81	16 / 0.70	4.4 / 0.113	0 / 0.00	254 / 4.16	153 / 3.19	15 / 0.42	23 / 0.370	0.4 / 0.02	0.10	25	515	9	361	153	DWR
		6-17-59		686	7.7	95 / 4.74	20 / 1.67	16 / 0.70	3.9 / 0.100	0 / 0.00	208 / 3.42	146 / 3.04	18 / 0.49	27 / 0.440	0.6	0.27	26	507	10	321	150	Term
		9-16-59		705	7.9	105 / 5.25	21 / 1.70	15 / 0.64	3.4 / 0.086	0 / 0.00	238 / 3.90	145 / 3.02	16 / 0.45	22 / 0.36	0.5 / 0.03	0.07	19	465	8	348	153	DWR
		12-23-59		650	7.6					0 / 0.00	256 / 4.20		11 / 0.31							317	107	DWR
Delman Water Co. Mun.	1N/4W-29F1	3-12-59		612	7.4	92 / 4.49	16 / 1.32	14 / 0.61	4.2 / 0.108	0 / 0.00	239 / 3.92	101 / 2.11	11 / 0.31	15 / 0.24	0.5 / 0.03	0.08	20	435	9	291	95	DWR
		9-16-59		773	7.9	122 / 6.10	23 / 1.90	15 / 0.65	3.6 / 0.093	0 / 0.00	241 / 3.95	196 / 4.08	14 / 0.40	22 / 0.35	0.5 / 0.03	0.06	19	486	7	400	202	DWR
		12-23-59		903	7.7					0 / 0.00	247 / 4.05		16 / 0.45							468	265	DWR
Norton Air Force Base Military	1S/3W-8M1	3-10-59		224	7.7	26 / 1.30	5 / 0.42	12 / 0.52	2.6 / 0.066	0 / 0.00	112 / 1.80	13 / 0.27	8.0 / 0.23	0.5 / 0.008	0.4 / 0.02	0.22	15	136	23	86		DWR
		7-8-59		217	7.4	22 / 1.10	8 / 0.66	10 / 0.44	2.4 / 0.06	0 / 0.00	109 / 1.78	13 / 0.28	7.0 / 0.20	2.4 / 0.04	0.6 / 0.03	0.19	10	133	19	88	0	DWR
Tri-City Rock Co. Ind.	1S/3W-9E2	3-12-59		370	7.8	45 / 2.25	10 / 0.81	16 / 0.70	3.8 / 0.097	0 / 0.00	181 / 2.92	13 / 0.27	26 / 0.73	2.7 / 0.04	0.3 / 0.02	0.33	25	239	18	153	7	DWR
		9-16-59		502	7.9	70 / 3.50	11 / 0.90	11 / 0.48	2.0 / 0.050	0 / 0.00	232 / 3.80	12 / 0.26	32 / 0.90	11 / 0.17	0.2 / 0.01	0.43	23	287	10	220	30	DWR
Cook Orchards Irr.	1S/3W-16A1	3-17-59		305	7.2	34 / 1.70	8.0 / 0.62	16 / 0.70	2.6 / 0.066	0 / 0.00	146 / 2.36	23 / 0.47	8.0 / 0.23	4.3 / 0.07	0.4 / 0.02	0.0	25	190	23	116	0	DWR
		9-14-59		268	7.5	33 / 1.65	5.0 / 0.45	15 / 0.65	1.6 / 0.042	0 / 0.00	128 / 2.10	19 / 0.40	2.0 / 0.05	6.2 / 0.10	0.4 / 0.02	0.03	26	169	23	105	0	DWR

ANALYSES OF GROUND WATER
1959

ANALYSES OF GROUND WATER

1959

Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by [b]
BUNKER HILL BASIN (8-2.06) (Continued)																						
Mesbur Realty Co. Dom.	1S/4W-13F3	3-12-59		277	8.0	33 / 1.65	8.0 / 0.63	12 / 0.52	2.7 / 0.070	0 / 0.00	131 / 2.12	17 / 0.36	12 / 0.34	5.4 / 0.09	0.4 / 0.02	0.22	15	178	18	114	8	DWR
		9-14-59		290	7.8	46 / 2.30	7.0 / 0.60	13 / 0.58	2.4 / 0.061	0 / 0.00	159 / 2.60	27 / 0.57	4.0 / 0.10	8.5 / 0.14	0.3 / 0.02	0.06	19	201	16	145	15	DWR
Gage Canal Co. Irr.	1S/4W-13G1	3-12-59		292	7.5	35 / 1.75	8.0 / 0.66	13 / 0.57	2.2 / 0.056	0 / 0.00	146 / 2.40	16 / 0.33	9.0 / 0.25	4.5 / 0.07	0.4 / 0.02	0.20	20	185	19	120	0	DWR
		6-9-59		342	7.5	44 / 2.20	8.0 / 0.66	15 / 0.65	2.1 / 0.054	0 / 0.00	164 / 2.68	22 / 0.46	13 / 0.37	8.0 / 0.13	0.6 / 0.03	0.30		211	18	146	12	SBCFCD
		9-14-59		300	7.8	47 / 2.35	7.0 / 0.60	14 / 0.60	1.8 / 0.046	0 / 0.00	162 / 2.65	19 / 0.39	9.0 / 0.25	9.3 / 0.15	0.4 / 0.02	0.26	20	198	17	148	15	DWR
		12-2-59		360	7.5	46 / 2.30	9.0 / 0.74	14 / 0.61	2.8 / 0.072	0 / 0.00	168 / 2.76	22 / 0.46	14 / 0.39	7.5 / 0.12	0.4 / 0.02	0.29		212	16	150	12	SBCFCD
Gage Canal Co. Irr.	1S/4W-13L1	3-12-59		374	7.5	46 / 2.30	10 / 0.82	14 / 0.61	2.6 / 0.067	0 / 0.00	156 / 2.56	31 / 0.65	9.0 / 0.25	23 / 0.37	0.5 / 0.03	0.0	20	250	17	157	29	DWR
		6-9-59		411	7.5	55 / 2.74	11 / 0.90	16 / 0.69	2.4 / 0.062	0 / 0.00	166 / 2.72	37 / 0.77	10 / 0.28	29 / 0.47	0.6 / 0.03	0.0		274	16	178	42	SBCFCD
		9-14-59		330	7.7	51 / 2.55	10 / 0.80	14 / 0.60	2.0 / 0.050	0 / 0.00	165 / 2.70	25 / 0.53	4.0 / 0.10	29 / 0.47	0.5 / 0.03	0.04	19	247	15	168	33	DWR
		12-2-59		374	7.6	48 / 2.40	9.0 / 0.74	14 / 0.61	2.4 / 0.061	0 / 0.00	164 / 2.68	29 / 0.60	9.0 / 0.25	19 / 0.31	0.5 / 0.03	0.0		235	16	155	21	SBCFCD

a. Gravimetric determination.
b. Analysis by San Bernardino County Flood Control District (SBCFCD) or State Department of Water Resources (DWR) as indicated.

ANALYSES OF GROUND WATER

1959

Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by b
SAN LUIS REY VALLEY, MISSION BASIN (9-7.01)																						
George Nagata Dom. & Irr.	11S/4W-4N1	3-27-59	--	1240	7.5					0 0.00	329 5.39		184 5.18							357	98	Term
		10- 7-59	67	1331	7.2	111 5.54	39 3.21	105 4.57	6.2 0.159	0 0.00	325 5.32	101 2.11	193 5.44	23 0.37	0.3 0.02	0.10	30	815	35	437	171	DWR
K. Johnson Dom. & Irr.	11S/4W-5K1	3-27-59	--	773	7.5	55 2.74	20 1.65	69 3.00	4.6 0.120	0 0.00	229 3.75	38 0.78	98 2.77	1.0 0.01	0.5 0.03	0.0	23	528	40	219	31	Term
		10-7-59	--	876	8.3	62 3.11	22 1.81	70 3.06	5.0 0.123	12 0.39	226 3.71	50 1.04	104 2.91	0 0	0.3 0.01	0.18	22	580	38	246		Term
J. S. Alvarado Dom. & Irr.	11S/4W-8H1	3-27-59	--	2450	7.6	169 8.47	64 5.27	253 10.98	8.4 0.220	0 0.00	338 5.53	311 6.49	472 13.29	1.0 0.01	0.5 0.03	0.04	24	1664	44	687	410	Term
		10- 7-59	70	2669	7.4	190 9.52	79 6.46	263 11.43	9.0 0.240	0 0.00	356 5.84	341 7.10	545 15.35	0 0	0.56	0.20	23	1826	41	799	507	Term
Academy of the Little Flower Dom. & Irr.	11S/4W-8J1	3-27-59	--	2430	7.5					0 0.00	331 5.44		540 15.21							587	315	Term
		10- 7-59	--	2600	--	170 8.50	67 5.50	292 12.70	7.8 0.200	0 0.00	320 5.25	226 4.67	576 16.25	17 0.27	0.3 0.02	0.13	30	1669	47	700	437	DWR
Clarence Nishizu Dom. & Irr.	11S/4N-8N1	3-27-59	--	2650	7.6					0 0.00	296 4.85		653 18.39							727	484	Term
		10- 7-59	--	2824	7.6	192 9.58	63 5.59	290 12.62	3.0 0.077	0 0.00	305 5.00	200 4.16	648 18.27	2.0 0.03	0.5 0.03	0.26	30	1805	45	758	508	DWR
S. Davies Dom. & Irr.	11S/4W-18C1	11-12-59	--	1140	7.4	95	34	89			198	146	180	0.4	0.6	0.08	41	800	35	370		
Carlsbad Mutual Water Co. Mun.	11S/4W-18C9	10- 7-59	66	2147	8.1	126 6.28	70 5.72	170 7.40	8.6 0.220	0 0.00	112 1.84	450 9.38	282 7.94	0 0	0.2 0.01	0	20	1365	38	600	508	Term

ANALYSES OF GROUND WATER

1959

Owner and use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chlorids (Cl)	Nitrate (NO_3)	Fluorids (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by b
						SAN LUIS REY VALLEY, MISSION BASIN (9-7.01) (Continued)																
Carlsbad Mutual Water Company Mun.	11S/4W-18L4	10-7-59	66	1448	7.8	113 / 5.64	41 / 3.34	127 / 5.52	6.6 / 0.170	0 / 0.00	316 / 5.18	195 / 4.07	200 / 5.64	0 / 0.00	0.2 / 0.01	0.08	30	872	38	449	190	DWR
Earl D. Amsler Dom.	11S/5W-13L1	8-26-59	--	1934	7.2	397 / 7.85	51 / 4.16	175 / 7.60	7.6 / 0.190	0 / 0.00	326 / 5.33	298 / 6.21	313 / 8.82	0 / 0	0	0.24	22	1468	38	600	333	Term
		10-7-59	68	2218	8.1	169 / 8.44	66 / 5.40	186 / 8.10	7.0 / 0.190	0 / 0.00	308 / 5.04	324 / 6.74	370 / 10.42	0 / 0	0.2 / 0.01	0.32	22	1490	37	692	440	Term
City of Oceanside Mun.	11S/5W-13Q1	10-8-59	--		7.2	320 / 15.95	132 / 10.85	314 / 13.65	12 / 0.30	0 / 0.00	283 / 4.64	227 / 4.73	1120 / 31.57	0 / 0	0.1	--		2720	32	1340		
Walter Johnson Ind.	11S/5W-23E1	3-26-59	--	25476	7.2	114 / 5.71	8221 / 67.61	4646 / 202.0	125 / 3.200	0 / 0.00	370 / 6.06	1155 / 24.04	8885 / 250.20	0	0	1.3	18	21644	72	3666	3363	Term

a. Gravimetric Determination.
b. Analysis by Terminal Testing Laboratories Inc. (TERM) or State Department of Water Resources (DWR).

ANALYSES OF GROUND WATER

1959

Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C ppm	Analyzed by [b]
EL CAJON VALLEY (9-16)																						
R. G. Alexander Dom. & Irr.	15S/1E-31R1	6-11-59	73	2054	8.2	115 5.74	67 5.48	202 8.79	4.3 0.110	15.6 0.52	211 3.46	266 5.54	308 8.67	133 2.15	0.8	0.09	69	1415	44	561	388	Term.
Jack Graves Dom. & Irr.	16S/1W-1G1	6-11-59	--	1650	7.2	143 7.15	79 6.51	152 6.60	2.7 0.070	0 0.00	271 4.45	322 6.71	224 6.31	217 3.50	0.5	0	84	1283	32	683	460	Term
		12-15-59	--	1947	7.1					0 0.00	276 4.54		225 6.34							748	521	Term
Bob Gilb Dom. & Irr.	16S/1W-2K6	6-11-59	--	2058	7.3					0 0.00	274 4.50		393 11.07	53 0.85						559	334	Term
		12-15-59	--	2157	7.2					0 0.00	268 4.40		409 11.52							620	400	Term
City of El Cajon Dom.	16S/1W-3C2	6-11-59	--	1679	8.1					9.0 0.31	145 2.39		399 11.22	0 0						353	233	Term
		12-15-59	--	1919	7.2	87 4.35	41 3.42	209 9.12	3.5 0.090	0 0.00	180 2.95	73 1.53	451 12.69	1.0 0.02	0.3	0.24	30	1195	54	389	241	Term
Ed. Fletcher Co. Mun.	16S/1W-3N1	6-11-59	78	1475	7.7					0 0.00	179 2.93		324 9.11	20 0.32						374	227	Term
Ed. Fletcher Co. Mun.	16S/1W-10D1	6-11-59	78	1356	7.8					0 0.00	152 2.50		305 8.59	7.0 0.11						257	132	Term.
		12-15-59	78	1392	7.4					0 0.00	167 2.74		313 8.83							260	123	Term
Ed. Fletcher Co. Mun.	16S/1W-10E2	6-11-59	81	1425	8.0					0 0.00	128 2.10		351 9.87							166	61	Term
		12-15-59	--	1256	7.5	68 3.40	25 2.05	133 5.77	5.0 0.130	0 0.00	167 2.74	92 1.93	228 6.42	2.0 0.04	0.4	0.16	25	800	51	273	136	Term

ANALYSES OF GROUND WATER
1959

ANALYSES OF GROUND WATER

1959

Owner and use Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micramhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by b
EL CAJON VALLEY (9-16) (Continued)																						
J. M. Conaway Irr.	16S/1W-11P4	6-11-59	--	3312	7.3					0 0.11	317 5.20		768 21.63	155 2.50						820	560	Term
		12-15-59	--	3510	7.3	166 8.32	160 13.13	382 16.60	40 0.100	0 0.00	322 5.23	163 3.41	1026 28.89	149 2.39	0.4 0.02	0.28	33	2415	44	1073	811	Term
Bud Robinson Dom.	16S/1W-12J4	6-11-59	74	1951	7.8					0 0.00	173 2.84		451 12.70	67 1.08						642	500	Term
R. S. Embleton Dom.	16S/1W-15K2	6-11-59	--	3005	7.8	92 4.60	74 6.08	454 19.73	0.8 0.020	0 0.00	483 7.92	229 4.77	612 17.23	47 0.76	0.6	0.34	88	2048	65	534	138	Term

a. Gravimetric determination.
b. Analysis by Terminal Testing Laboratories, Inc. (Term) as indicated.

ANALYSES OF GROUND WATER
1959

Owner and use / Source	State well number and other number	Date sampled	Temp °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: NC ppm	Analyzed by [b]
TIA JUANA VALLEY BASIN (9-19)																						
Calif., Water and Telephone Co. Test	18S/2W-32H1	3-18-59	69	6490	7.4	353 / 17.60	190 / 15.60	1046 / 45.50	11 / 0.275	0 / 0.00	650 / 10.65	792 / 16.48	1801 / 50.80	1.2 / 0.02	1.0 / 0.06	0.52	46	4818	58	1660	1127	DWR
		10-20-59	69	6400	8.0	493 / 24.60	246 / 20.20	1195 / 57.00	9.8 / 0.250	0 / 0.00	555 / 9.10	786 / 16.37	2730 / 77.00	3.0 / 0.05	1.4 / 0.08	0.90	26	6367	56	2240	1785	DWR
Calif. Dept. of Veterans Affairs Obs.	18S/2W-32P2	4-7-59		6162	7.4					0 / 0.00	385 / 6.32		1832 / 51.64							1108	782	Term
Calif. Water and Telephone Co. Test	18S/2W-32P4	3-19-59		15100	7.2	293 / 14.60	430 / 35.40	2460 / 107.0	98 / 2.500	0 / 0.00	20 / 0.33	394 / 8.21	5319 / 150.0	7.2 / 0.12	0.4 / 0.02	0.50	3.0	10408	67	2500	2485	DWR
		10-20-59	68	22408	7.0	605 / 30.20	651 / 53.50	3657 / 159.0	113 / 2.900	0 / 0.00	283 / 4.64	993 / 20.67	7605 / 214.2	0 / 0	0.5 / 0.03	1.1	21	14800	65	4285	4053	Term
James Jackson Irr.	18S/2W-33K4	3-19-59	70	3610	7.4	238 / 11.90	95 / 7.85	437 / 19.00	7.4 / 0.190	0 / 0.00	433 / 7.10	675 / 14.05	642 / 18.10	2.7 / 0.04	0.7 / 0.04	0.14	25	2450	46	988	633	DWR
		10-22-59	69	3320	7.8					0 / 0.00	430 / 7.05		699 / 19.70							1020	767	DWR
Henry Schaffner Irr.	18S/2W-35L1	3-18-59		4910	7.5					0 / 0.00	589 / 9.65		1358 / 38.30							4910	4437	DWR
		10-22-59	71	4240	7.4	275 / 13.70	122 / 10.05	591 / 25.70	9.0 / 0.230	0 / 0.00	491 / 8.05	323 / 6.73	1259 / 35.50	18 / 0.29	0.7 / 0.04	0.48	38	3071	52	1188	785	DWR
Henry Schaffner Irr.	19S/2W-2K1	10-21-59	69	2400	7.8	238 / 11.90	91 / 7.45	384 / 18.30	6.3 / 0.160	0 / 0.00	342 / 5.60	398 / 8.28	791 / 22.30	81 / 1.30	1.0 / 0.06	0.24	20	2368	48	967	687	DWR
Aballo and Wright Irr.	19S/2W-3A1	3-18-59		4200	7.7					0 / 0.00	412 / 6.75		964 / 27.20							940	602	DWR
Calif. Water and Telephone Co. Mun.	19S/2W-4A5	3-18-59	69	2700	8.1	168 / 8.40	77 / 6.30	304 / 13.20	6.1 / 0.157	0 / 0.00	354 / 5.80	391 / 8.15	488 / 13.75	2.6 / 0.04	0.7 / 0.04	0.23	22	1720	47	735	455	DWR
		10-21-59	69	2170	7.5	124 / 6.19	50 / 4.11	264 / 11.48	4.4 / 0.113	0 / 0.00	329 / 5.40	220 / 4.59	422 / 11.90	0 / 0	0.6 / 0.03	0.36	20	1390	52	513	243	DWR

ANALYSES OF GROUND WATER
1959

ANALYSES OF GROUND WATER

1959

Owner and use / Source	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C. ppm	Analyzed by [b]
TIA JUANA VALLEY BASIN (9-19) (Continued)																						
Calif. Water and Telephone Co. Test	19S/2W-5C6	3-18-59		20284	7.4	766 38.22	554 45.58	3302 143.6	34 0.880	0 0.00	318 5.22	1043 21.73	7277 205.0	1.0 0.01	0.9 0.05	0.71	22	13844	63	4190	3929	Term
		10-21-59	69	21636	6.9	798 39.80	637 52.40	3217 139.9	39 1.010	0 0.00	354 5.80	1062 22.12	7390 208.1	0 0	0.7	0.50	18	14320	60	4610	4320	Term
Knox Dairy Irr.	19S/2W-5G18	3-19-59	69	6100	7.1	357 17.80	181 14.85	947 41.20	14 0.350	0 0.00	412 6.75	483 10.05	2046 57.70	0.9 0.02	0.5 0.03	0.32	50	4737	56	1633	1245	DWR
		10-21-59	68	7117	7.1	337 16.80	224 18.40	850 36.96	10 0.260	0 0.00	305 5.00	475 9.89	2048 57.67	0 0	0.8	0.28	22	4616	51	1760	1510	Term
Calif. Water and Telephone Co. Test	19S/2W-5I2	3-19-59	71	5340	7.8	225 11.25	123 10.10	690 30.00	24 0.625	0 0.00	323 5.30	330 6.88	1440 40.60	4.0 0.07	0.7 0.04	0.29	29	3336	58	1068	803	DWR
		10-21-59	70	5719	7.1	302 15.04	90 7.40	787 34.20	13 0.320	0 0.00	321 5.26	335 6.97	1578 44.44	0 0	0.51 0.03	0.62	23	3715	60	1122	859	Term

a. Gravimetric determination.
b. Analysis by Terminal Testing Laboratories Inc. (Term) or State Department of Water Resources (DWR) as indicated.

QUALITY OF GROUND WATERS IN CALIFORNIA
RADIOASSAY OF GROUND WATER

STATE WELL NUMBER	DATE SAMPLED	TOTAL ACTIVITY uuc/l[a]	DATE ANALYZED
		CENTRAL COASTAL REGION NO. 3	
		SANTA MARIA RIVER VALLEY (3-12)	
SBB&M			
9N/32W-17G1	9-29-59	5.56 ± 1.72	2- 5-60
9N/33W- 8K1	9-29-59	0.00 ± 1.63	2- 5-60
- 9A1	9-29-59	0.00 ± 1.58	2- 4-60
-12R1	9-29-59	7.52 ± 1.87	2- 4-60
10N/34W- 6N1	9-29-59	4.39 ± 1.67	2- 4-60
-16R1	9-29-59	0.00 ± 1.59	2- 5-60
-19H1	9-29-59	5.32 ± 2.01	2- 4-60
-21R1	9-29-59	0.00 ± 1.87	2- 4-60
10N/35W- 4C1	9-29-59	12.41 ± 2.05	2- 4-60
11N/34W-19Q1	9-29-59	7.63 ± 1.71	2- 4-60
11N/35W-18M1	9-29-59	5.51 ± 1.68	2- 4-60
11N/36W-13R1	9-29-59	10.03 ± 1.96	2- 5-60
		CUYAMA VALLEY (3-13)	
10N/25W-22E1	10- 6-59	5.45 ± 2.00	2- 4-60
-23E1	7-28-59	12.1 ± 2.43	12- 6-59
-30F1	7-28-59	3.4 ± 2.13	12- 6-59
10N/26W- 4R1	10- 6-59	10.42 ± 2.03	2- 4-60
-14C4	10- 6-59	4.41 ± 1.71	2- 5-60
10N/27W-11C1	7-28-59	5.3 ± 3.7	

a MICROMICROCURIES PER LITER — PROBABLE ERROR COMPUTED AT ONE STANDARD DEVIATION IN MICROMICROCURIES PER LITER WITHOUT SELF ABSORBTION CORRECTION.

QUALITY OF GROUND WATERS IN CALIFORNIA

RADIOASSAY OF GROUND WATER

STATE WELL NUMBER	DATE SAMPLED	TOTAL ACTIVITY uuc/l[a]	DATE ANALYZED
LOS ANGELES REGION NO. 4			
OXNARD PLAIN PRESSURE AREA (4-4.01)			
SBB&M			
1N/21W-30A1	5- 8-59	4.3 ± 0.7	5-25-59
1N/22W- 3F4	5- 7-59	5.6 ± 0.8	5-25-59
- 3F4	12- 7-59	9.8 ± 1.87	2-24-60
- 7D1	5- 7-59	4.2 ± 0.7	5-25-59
- 7D1	12- 2-59	2.98 ± 1.94	5-19-60
- 9Q3	5- 7-59	4.9 ± 0.8	5-22-59
-18E1	5- 7-59	4.3 ± 0.7	5-25-59
-20B1	11-20-59	0.32 ± 1.90	5-19-60
-20E2	5- 7-59	4.5 ± 0.8	5-25-59
-23C1	5- 7-59	4.7 ± 0.9	5-22-59
-26A1	5- 7-59	3.0 ± 0.9	5-22-59
-28A2	5- 7-59	3.2 ± 0.9	5-22-59
-28H2	5- 7-59	2.9 ± 0.9	5-22-59
-36K1	2- 6-59	2.9 ± 0.9	2-25-59
WEST COAST BASIN (4-11.02)			
SANTA MONICA BAY AREA			
2S/15W-34K1	3-27-59	3.8 ± 0.9	4-25-59
-34K1	10- 9-59	7.17 ± 1.60	2- 5-60
3S/14W- 7K2	10-30-59	0.00 ± 1.89	5-27-60

a MICROMICROCURIES PER LITER — PROBABLE ERROR COMPUTED AT ONE STANDARD DEVIATION IN MICROMICROCURIES PER LITER WITHOUT SELF ABSORBTION CORRECTION.

QUALITY OF GROUND WATERS IN CALIFORNIA

RADIOASSAY OF GROUND WATER

STATE WELL NUMBER	DATE SAMPLED	TOTAL ACTIVITY uuc/l[a]	DATE ANALYZED
		SANTA MONICA BAY AREA (continued)	
3S/14W-30G1	4-10-59	7.8 ± 0.9	5-11-59
-31A3	10-15-59	0.0 ± 1.57	2- 5-60
-32F1	4-10-59	5.9 ± 0.9	4-24-59
-32F1	4-10-59	5.4 ± 0.9	4-24-59
3S/15W-12H2	10-30-59	4.68 ± 1.99	5-27-60
-25A3	10- 9-59	0.00 ± 1.54	2- 5-60
		HAWTHORNE-GARDENA AREA	
4S/13W- 6Q1	4-17-59	5.2 ± 0.9	5- 8-59
4S/14W-35E1	4-15-59	5.6 ± 0.9	5-12-59
		TORRANCE AREA	
3S/14W-25K4	4- 6-59	5.3 ± 0.9	5-11-59
-27C1	4-14-59	3.4 ± 0.9	5- 8-59
-35M5	4-10-59	5.0 ± 0.9	5- 8-59
		CENTRAL BASIN PRESSURE AREA (4-11.02) AND LOS ANGELES FOREBAY AREA (4-11.04)	
2S/13W-10P4	5- 5-59	6.9 ± 0.9	5-21-59
-15N3	5- 5-59	5.3 ± 0.9	5-21-59
		MAIN SAN GABRIEL BASIN (4-13.01)	
1S/10W- 7A1	5- 1-59	4.1 ± 0.9	5-11-59
-10C1	5- 1-59	4.1 ± 0.9	5-11-59
-19N1	5- 1-59	5.5 ± 0.9	5-12-59

a MICROMICROCURIES PER LITER — PROBABLE ERROR COMPUTED AT ONE STANDARD DEVIATION IN MICROMICROCURIES PER LITER WITHOUT SELF ABSORBTION CORRECTION.

QUALITY OF GROUND WATERS IN CALIFORNIA

RADIOASSAY OF GROUND WATER

STATE WELL NUMBER	DATE SAMPLED	TOTAL ACTIVITY uuc/l[a]	DATE ANALYZED
	MAIN SAN GABRIEL BASIN (4-13.01) (continued)		
1S/11W-10F1	5- 1-59	3.3 ± 0.8	5-12-59
-26K1	5- 1-59	5.6 ± 0.9	5-12-59
-32C1	5- 1-59	4.0 ± 0.9	5-12-59
-33P1	5- 1-59	5.9 ± 0.9	5-12-59

a MICROMICROCURIES PER LITER — PROBABLE ERROR COMPUTED AT ONE STANDARD DEVIATION IN MICROMICROCURIES PER LITER WITHOUT SELF ABSORBTION CORRECTION.

RADIOASSAY OF GROUND WATER

STATE WELL NUMBER	DATE SAMPLED	TOTAL ACTIVITY uuc/l[a]	DATE ANALYZED
		LAHONTAN REGION (NO. 6)	
		LOWER MOJAVE RIVER VALLEY, BARSTOW TO YERMO (6-40)	
SBB&M			
9N/1E- 1M1	3-24-59	5.9 ± 0.9	4- 2-59
-15N2	3-29-59	7.8 ± 0.9	4- 2-59
9N/1W- 5J2	3-24-59	5.9 ± 0.9	4- 2-59
- 5J3	11- 3-59	6.7 ± 0.9	5-27-60
- 9G1	3-24-59	7.2 ± 0.9	4- 2-59
-10D2	3-24-59	3.7 ± 0.9	4- 3-59
-10D2	11- 3-59	2.50 ± 1.98	12- 4-59
-10G1	3-26-59	28.5 ± 1.2	4- 3-59
-10G1	11- 3-59	4.81 ± 1.99	5-27-60
10N/1W-32J1	3-24-59	5.8 ± 0.9	4- 3-59

a MICROMICROCURIES PER LITER — PROBABLE ERROR COMPUTED AT ONE STANDARD DEVIATION IN MICROMICROCURIES PER LITER WITHOUT SELF ABSORBTION CORRECTION.

QUALITY OF GROUND WATERS IN CALIFORNIA

RADIOASSAY OF GROUND WATER

STATE WELL NUMBER	DATE SAMPLED	TOTAL ACTIVITY uuc/l[a]	DATE ANALYZED
		COLORADO RIVER BASIN REGION NO. 7	
		COACHELLA VALLEY (7-21) SOUTH END	
SBB&M			
5S/7E-16K1	5- 5-59	4.7 ± 0.9	5-17-59
-22K1	5- 5-59	10.0 ± 1.9	5-17-59
-33C1	5- 5-59	4.6 ± 0.9	5-17-59
-33D1	5- 5-59	7.8 ± 0.9	5-17-59
-33N1	5- 5-59	7.2 ± 0.7	5-17-59
6S/7E-25E1	5- 6-59	2.7 ± 0.9	5-19-59
6S/8E- 7P1	5- 6-59	5.3 ± 0.9	5-21-59
- 7P1	12-16-59	1.17 ± 1.77	5-12-60
-10A3	5- 6-59	3.5 ± 0.9	5-17-59
-10A3	12-27-59	1.46 ± 1.78	5-19-60
-27H1	5- 6-59	2.4 ± 0.9	5-19-59
6S/9E-30C1	5- 6-59	1.1 ± 0.9	5-19-59
7S/8E-22M1	5- 6-59	1.9 ± 0.9	5-19-59
7S/9E-16K1	5- 6-59	1.9 ± 0.9	5-19-59

a MICROMICROCURIES PER LITER — PROBABLE ERROR COMPUTED AT ONE STANDARD DEVIATION IN MICROMICROCURIES PER LITER WITHOUT SELF ABSORBTION CORRECTION.

RADIOASSAY OF GROUND WATER

STATE WELL NUMBER	DATE SAMPLED	TOTAL ACTIVITY uuc/l[a]	DATE ANALYZED
		SANTA ANA REGION NO. 8	
		ANAHEIM BASIN PRESSURE AREA (8-1.01)	
SBB&M			
5S/11W-21M3	3- 6-59	1.6 ± 0.9	4- 6-59
-21N2	3- 6-59	3.0 ± 0.9	4- 7-59
-25R2	3- 5-59	3.7 ± 0.9	4- 5-59
-28H2	3- 5-59	2.9 ± 0.9	4- 5-59
-29C1	3- 6-59	0.2 ± 0.8	4- 6-59
-34F3	3- 5-59	3.6 ± 0.9	4- 7-59
-36B2	3- 5-59	4.6 ± 0.9	4- 7-59
-36P1	3- 4-59	3.3 ± 0.9	4- 5-59
5S/12W-12C1	3- 9-59	0.5 ± 0.9	4- 5-59
6S-10W- 5C1	3-16-59	2.0 ± 0.9	4- 5-59
- 5M1	2-27-59	8.2 ± 0.9	4- 4-59
- 6L2	2-27-59	1.9 ± 0.8	4- 4-59
- 7D3	2-27-59	3.1 ± 0.8	4- 4-59
- 7G1	2-27-59	0.3 ± 0.9	4- 5-59
-18B4	3- 3-59	2.5 ± 0.9	4- 7-59
6S/11W- 1B1	3- 6-59	5.2 ± 0.9	4- 6-59
- 1J3	3- 3-59	2.0 ± 0.9	4- 7-59
- 3R2	3- 6-59	4.0 ± 0.9	4- 6-59

a MICROMICROCURIES PER LITER — PROBABLE ERROR COMPUTED AT ONE STANDARD DEVIATION IN MICROMICROCURIES PER LITER WITHOUT SELF ABSORBTION CORRECTION.

QUALITY OF GROUND WATERS IN CALIFORNIA

RADIOASSAY OF GROUND WATER

STATE WELL NUMBER	DATE SAMPLED	TOTAL ACTIVITY uuc/l[a]	DATE ANALYZED
		CHINO BASIN (8-2.01)	
SBB&M			
1S/ 6W-29R1	12-17-59	5.43 ± 1.84	5-19-60
1S/ 7W-28R1	3-26-59	1.7 ± 0.9	5- 6-59
-28R1	12-17-59	0.00 ± 1.75	5-12-60
1S/ 7W-34M1	3-13-59	4.1 ± 0.8	4-20-59
-34M1	9-21-59	4.3 ± 2.09	12- 3-59
2S/ 7W-10M1	3-26-59	3.3 ± 0.9	5- 6-59
-10M1	12-17-59	0.00 ± 2.23	5-12-60
-15A1	12-17-59	4.12 ± 1.79	5-12-60
-21L1	3-26-59	2.6 ± 0.9	4-27-59
-21L1	12-17-59	0.93 ± 1.77	5-12-60
-23E1	3-26-59	4.6 ± 0.9	4-27-59
-23E1	12-17-59	3.56 ± 1.8	5-12-60
-27A1	3-26-59	3.2 ± 0.8	5- 5-59
-27A1	5-19-59	4.6 ± 0.9	6- 4-59
-27A1	12-17-59	3.56 ± 1.8	5-12-60
		BUNKER HILL BASIN (8-2.06)	
SBB&M			
1N/ 4W-29E1	3-12-59	4.8 ± 0.9	4-13-59
-29F1	3-12-59	4.9 ± 0.9	4-13-59
-29F1	9-16-59	8.3 ± 2.19	12- 3-59

a MICROMICROCURIES PER LITER — PROBABLE ERROR COMPUTED AT ONE STANDARD DEVIATION IN MICROMICROCURIES PER LITER WITHOUT SELF ABSORBTION CORRECTION.

STATE WELL NUMBER	DATE SAMPLED	TOTAL ACTIVITY uuc/l[a]	DATE ANALYZED
	BUNKER HILL BASIN (8-2.06) (continued)		
SBB&M			
1S/3W- 8M1	3-10-59	18.0 ± 1.1	4-13-59
- 9E2	3-12-59	8.7 ± 0.9	4-20-59
- 9E2	9-16-59	0.00 ± --	12- 4-59
-16A1	3-17-59	10.0 ± 0.9	4-20-59
-16A1	4-19-59	2.5 ± 1.88	12- 6-59
1S/4W-13F3	3-12-59	5.5 ± 0.9	4-14-59
-13F3	9-14-59	3.9 ± 2.13	12- 6-59
-13G1	3-12-59	6.6 ± 0.9	4-14-59
-13G1	9-14-59	0.00 ± --	12- 6-59
-13L1	3-12-59	5.1 ± 0.9	4-14-59
-13L1	9-14-59	6.6 ± 2.19	12- 6-59

a MICROMICROCURIES PER LITER — PROBABLE ERROR COMPUTED AT ONE STANDARD DEVIATION IN MICROMICROCURIES PER LITER WITHOUT SELF ABSORBTION CORRECTION.

QUALITY OF GROUND WATERS IN CALIFORNIA

RADIOASSAY OF GROUND WATER

STATE WELL NUMBER	DATE SAMPLED	TOTAL ACTIVITY uuc/l[a]	DATE ANALYZED
		SAN DIEGO REGION No. 9	
		SAN LUIS REY VALLEY, MISSION BASIN (9-7.01)	
SBB&M			
11S/4W- 4N1	3-27-59	7.3 ± 0.9	4-17-59
- 4N1	10- 7-59	2.53 ± 1.72	2- 4-60
- 5K1	3-27-59	5.5 ± 0.9	4-17-59
- 5K1	10- 7-59	0.82 ± 1.59	2- 5-60
- 8H1	3-27-59	3.9 ± 0.9	4-17-59
- 8H1	10- 7-59	13.61 ± 2.05	2- 4-60
- 8J1	3-27-59	2.2 ± 0.8	4-15-59
- 8J1	10- 7-59	0.0 ± 1.50	2- 4-60
- 8N1	3-27-59	2.0 ± 0.8	4-15-59
- 8N1	10- 7-59	0.73 ± 1.68	2- 4-60
-18C9	10- 7-59	0.0 ± 1.84	2- 5-60
-18L4	10- 7-59	1.35 ± 1.51	2- 5-60
11S/5W-13L1	3-26-59	4.6 ± 0.9	4- 3-59
-13L1	10- 7-59	0.19 ± 1.68	2- 4-60
		EL CAJON VALLEY (9-16)	
15S/1E-31R1	12-15-59	2.91 ± 1.87	2-24-60
16S/1W- 1G1	12-15-59	0.00 ± 1.68	5-12-60
- 2K6	12-15-59	0.00 ± 1.66	5-12-60
-10D1	12-15-59	9.05 ± 1.87	5-12-60

a MICROMICROCURIES PER LITER — PROBABLE ERROR COMPUTED AT ONE STANDARD DEVIATION IN MICROMICROCURIES PER LITER WITHOUT SELF ABSORBTION CORRECTION.

RADIOASSAY OF GROUND WATER

STATE WELL NUMBER	DATE SAMPLED	TOTAL ACTIVITY uuc/l[a]	DATE ANALYZED
	EL CAJON VALLEY (9-16) (continued)		
16S/1W-10E2	12-15-59	10.38 ± 1.87	5-12-60
-15K2	12-15-59	3.64 ± 1.85	2-17-60
	TIA JUANA VALLEY BASIN (9-19)		
18S/2W-32H1	3-18-59	3.1 ± 0.9	5- 6-59
-32P2	4- 7-59	2.9 ± 0.9	6-12-59
-32P4	3-19-59	5.4 ± 0.9	4-22-59
-33K4	3-19-59	1.4 ± 0.9	4-29-59
-35L1	3-18-59	2.4 ± 0.8	4-27-59
19S/2W- 3A1	3-18-59	5.2 ± 0.9	4-29-59
- 4A5	3-18-59	2.3 ± 0.9	4-29-59
- 5C6	3-18-59	2.1 ± 0.9	5- 5-59
- 5G18	3-19-59	1.4 ± 0.8	4-15-59
- 5L2	3-19-59	5.1 ± 0.9	4-22-59

a MICROMICROCURIES PER LITER — PROBABLE ERROR COMPUTED AT ONE STANDARD DEVIATION IN MICROMICROCURIES PER LITER WITHOUT SELF ABSORBTION CORRECTION.